The Factors Associated with Cigarette Smoking among Young Adults (16-25 years) in South Africa.

by

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Declaration

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Abstract

Cigarette smoking is a worldwide health concern and evidence of the impact it has on the health of smokers and non-smokers is indisputable. Young adults are a “risk prone” segment of populations, as young smokers may underestimate the risk of tobacco addiction and are often uninformed about the dangers of smoking. In addition, tobacco smoking in developing countries is a bourgeoning epidemic that requires further research.

The study design of this dissertation was a secondary analysis of the existing National Income Dynamics Survey (NIDS) data. The first nationally representative cohort study (wave 1) was conducted in South Africa in 2008, with wave 3 in 2012. A sample of 5528 for wave 1 and 6155 for wave 3 of young adults (aged 16-25) was used. The dependent variable was reporting to have “Ever smoked regularly” and independent variables included age, gender, population group, geographic location, education and economic variables.

The study found that among young adults in South Africa, the percentage of young smokers has remained relatively unchanged between the two NIDS waves. Participants reported that they started smoking in their mid- to late- teens, and smoked an average of 7 cigarettes a day. Smoking was more prevalent in males and was positively associated with age. Smoking was particular prevalent among the Coloured population group. People in urban areas were more likely to smoke and education had a mitigating effect on smoking prevalence.

Smoking in young adults remains an important problem in South Africa and there is an urgent need for further research into developing creative anti-smoking strategies and interventions that are culturally and linguistically appropriate. Research that informs these programmes can reduce youth smoking and have long-term benefits for public health.

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To my family, Heather, Russell and Megan, thank you for your unconditional love, support and understanding. I am lucky to have been reminded that a mountain is climbed one step at a time – I dedicate this thesis to you.

Acronyms

CI Confidence Interval

NIDS National Income Dynamic Survey

OR Odds Ratios

SA South Africa

SES Socioeconomic status

SSA sub-Saharan Africa

USA United States of America

WHO World Health Organisation

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Chapter One
Introduction

"Globally it is estimated that 250 million children alive today will eventually die from tobacco-related illness" (Gilreath et al., 2012, p. 27).

1.1 Background

Cigarette smoking is currently the foremost cause of avertable morbidity and mortality across the globe (Dube et al., 2010), largely because nicotine is highly addictive (Hu et al., 2006). Cigarette use causes at least 6 million deaths per year worldwide and, Wlodarczyk et al. (2013) highlighted that tobacco smoking kills over 600 000 non-smokers in the United States of America (USA) alone – through exposure to secondhand smoke. Despite the abundance of conclusive evidence, it was revealed in 2012, that the tobacco industry spent 9.17 billion dollars on the promotion and advertisement of cigarettes (Jha et al., 2013). The industry intentionally engineers cigarettes to be addictive and maintains this addiction through consumer signals and media messages.

Colditz (2000) described that in 1964 the knowledge that smoking causes a myriad of diseases surfaced, and a paradigm shift with regard to tobacco use occurred. Globally, cigarette smoking causes approximately 71% of lung cancer, 42% of pulmonary disease and approximately 10% of cardiovascular disease (Dube, 2010). In layman's terms, smoking causes cancer by damaging the body's cells, particularly in the lungs, causing significant and undesired changes in tissue. Pulmonary diseases include emphysema and chronic bronchitis, and are often caused and exacerbated by cigarette smoking. Smoking can also damage the tissue that lines arteries, narrowing them, causing cardiovascular disease, which can result in a heart attack or a stroke (Dube, 2010).

According to Jha et al. (2013), life expectancy for cigarette smokers is approximately 10 years shorter than for those who do not smoke. Smokers who die prematurely increase the cost of health care and deprive their families of income. Yet alarmingly, it was estimated in 2013, that 1 billion people smoked and consumed approximately 6 trillion cigarettes annually. It is important to establish the connection between cigarette smoking and premature death, especially when conveying anti-smoking messages to young adults, as Dube et al. (2010) has warned that there has been a slowing in the decline of youth smokers.

Barreto et al. (2012) explained that tobacco use in adolescence is associated with use during adulthood. This further highlights that a focus on young adults is vital in order to curb cigarette smoking. According to Beretto et al. (2012), regular smoking can also cause ailments among younger populations – level of fitness and lung functions diminish and the incidence of bronchitis and asthma increases. According to Vajravelv et al. (2015), young adult smokers may even experience decreases in cognitive performance. In order to achieve a reduction in cigarette smoking, the progression of smoking among young adults requires understanding and attention, as it is in these formative years that nicotine dependence is established and continued into adulthood (Tauras, 2005). The success of anti-smoking campaigns hinges on a thorough understanding of the factors associated with the phenomenon.

Hammond (2005), an academic in the field of adolescent smoking, has explained that "significant life transitions" which occur outside of school, point to increased cigarette consumption. He argued that changes in living arrangements and social networks may make young adults susceptible to smoking. Hammond (2005) reiterated that young adults are more vulnerable to tobacco marketing because young adulthood can be chaotic and stressful, and peer group influence is high.

Hammond (2005) also highlighted that not only does the tobacco industry promote experimentation, but also encourages smoking through various mechanisms. The author used the Canadian tobacco company-fueled night clubs and "multimedia communities" as an example of how tobacco companies are creating allure. Ling and Glantz (2002), like Hammond, noted that the industry values young adults because they encounter significant changes in their lives, which

render them highly susceptible to marketing strategies. They also described the tobacco industry's "bar promotions" that are left unmonitored by the government. Ling and Glantz (2002) also argued that the tobacco industry's aim is to normalize smoking, particularly among young adults. They accessed "previously secret tobacco industry documents" to uncover how and why young adults are targeted. They concluded that the tobacco industry has extensively researched young adults' social groups, role models, values, and activities in order to tailor specific marketing strategies.

Harakeh et al. (2010), like Hammond (2005), stated that although tobacco advertising is prohibited in visual media, entertainment media remains a mechanism through which tobacco companies are disseminating pro-smoking messages, by depicting characters that smoke. Harakeh et al. (2010) found that movie stars with high social status influenced viewers smoking behaviour. Harakeh et al. (2010) noted the importance of anti-smoking advertisements, particularly when coupled with films featuring smoking. The authors further elaborated that screening an anti-smoking message, prior to a film that contains smoking, could demote smoking. The authors explained that young adults typically enjoy highly influential "entertainment media," for hours at a time.

Muula et al. (2008) stated that adolescent and young adult smoking is a "critical health exercise," and in agreeance with Brook et al. and Baretto et al. (2012) described that it is multifactorial in nature. Muula et al. (2008) investigated the prevalence of smoking among young adults in Malawi, as well as the variables associated with cigarette use. Muula et al. (2008), like Hammond (2005), Ling and Glantz (2002), and Harakeh et al. (2010) firmly asserted that the advertisement and promotion of cigarettes negatively impacts on young adults. Other authors in the field, Aryal and Bhatta (2015), were interested in how Nepalese youth perceived the benefits and risks of smoking. They also believed that young adulthood is a vulnerable phase of life and highlighted that tobacco companies target young adults as they are most likely to experiment and progress to confirmed, regular smokers. The authors found that most Nepalese young adults' perception of smoking was that cigarettes are not addictive and they did not have a thorough understanding of the health implications. They concluded with the notion that it is as important to counteract the misinformed perceptions, as it is to convey health risk messages.

In the USA, a developed nation, about 443 000 premature deaths can be attributed to cigarette smoking per day. Lutfiyya et al. (2008) described that although the prevalence of current smokers in the USA has decreased, the percentage of adolescent smokers (23%) remains well above the goal (16%) set by "Healthy People 2010." Neff et al. (2015) examined the "frequency of tobacco use among middle and high school students" in the USA in 2014, and in agreeance with Hammond (2005), espoused that researching young people's smoking habits is of great importance, as it is during this time that "lifelong nicotine addiction" can be established. In 2014 it was estimated that 4.6 million American middle and high school students had used tobacco products. It was also found that high school students used tobacco products more frequently than middle school students, providing evidence that tobacco use can escalate during adolescence. The overall aim of the article was to guide policy implementation and draw attention to the rise in tobacco use among youths in the USA (Neff et al., 2015).

In 2004, in low- and middle-income regions, 7.2% of deaths were due to tobacco use, and in high-income regions, 17.9% of deaths were attributed to tobacco use (Jha & Phil, 2012). More recent research conducted in 2012 uncovered that cigarette smoking is increasing in many low- and middle- income countries, while gradually decreasing in many high-income countries. (WHO, 2009). In the 21st century, it is predicted that "smoking-attributable mortality" will rise to one billion people and in contrast, deaths will be concentrated in low- and middle-income countries (WHO, 2009). Mashita et al. (2011) noted that in the next 20 years smoking in the developing world is expected to increase rapidly, partly because tobacco industry marketing will concentrate on the youth.

Giovino et al. (2012) examined "3 billion individuals from 16 countries" using a nationally representative cross-sectional household survey. Their objective was to gain information on the prevalence of adult smoking (including those aged 15 and older). Their area of focus was middle- to low-income countries as they remain absent from data collection and analysis. The authors advised that in order to lower the prevalence of tobacco use, particularly in poorer regions, the initiation process needs to be examined and researched at length. Giovino et al. (2012) also cautioned that tobacco use in middle- and low-income countries is increasing rapidly, and advised that this phenomenon be studied in-depth. Williams et al. (2008), like Giovino et al.

(2012), explained that tobacco consumption is rising in emerging markets such as Latin America, Asia and Africa.

Sreeramareddy et al. (2014) noted that information about smoking and smokeless tobacco (SLT) in sub-Saharan Africa (SSA) was limited. The authors, henceforth, provided prevalence estimates and addressed the social and demographic determinants of smoking and SLT in 30 sub-Saharan African countries. The data Sreeramareddy et al. (2014) obtained, highlighted that in all of the sub-Saharan African countries, men smoked more than women. In countries such as Sierra Leone, Madagascar and Lesotho, almost a third of adult men smoked daily. It was found that Burundi had the highest prevalence of smoking as well as SLT use, and second to Burundi was Madagascar. The authors espoused that because sub-Saharan African countries are poor, tobacco prevalence is typically low. They warned, however, like Williams et al. (2008) and Giovino et al. (2012) that current economic growth occurring in many sub-Saharan African countries will rapidly increase smoking prevalence, and if tobacco control legislation continues to be neglected, the problem will be compounded.

Other authors that focused on sub-Saharan Africa included Brathwaite et al. (2014). They conducted a systematic literature review in order to assess the smoking prevalence and control strategies in place in sub-Saharan African countries from 2009 to 2014. Brathwaite et al. (2014) noted that in Africa, cigarette consumption has increased by 57% from 1990 to 2009, highlighting a need for further consideration. The authors noted the shifting tobacco consumption pattern, from high consumption in high-income Western European countries (where current consumption has fallen by 26 %) to African and Middle Eastern countries, where consumption has doubled. SSA is in the first stages of a tobacco epidemic which, according to the authors, warrants special attention. It was highlighted by Brathwaite et al. (2014) that a region in the first stage of a tobacco consumption epidemic has much higher male smoking rates than female smoking rates. In SSA, estimated smoking prevalence was 14 % among males and 2% among females - indicative of the first epidemic stage. The authors hypothesized that the disparity between genders may be due to the social or cultural taboos surrounding female smoking, and the societal acceptance of male smoking in certain populations.

Brathwaite et al.'s (2014) main findings were that smoking prevalence "varied immensely" across SSA ranging from 25.8 % in Sierra Leone to 1.8 % in Zambia. Countries with the highest smoking rates included South Africa and Sierra Leone. Although urban/rural prevalence rates were largely inconsistent, contrary to Sreeramareddy et al. (2014), it was found that in most countries, those residing in urban areas smoked more. The authors concluded that this may be due to greater access to cigarettes in urban areas. Overall, the review showed that in many SSA countries smoking rates are increasing and in order to combat this, the authors advised that public health sectors prioritize smoking in order to lessen the burden of disease.

In South Africa, in 1992, one third of the adult population smoked cigarettes (Sitas et al., 2004). This may, in part, be attributed to the government that was in power (The National Party), whose 'allegiance' lay with the tobacco industry, despite the medical revelation that cigarette smoking caused a myriad of ailments (Vellios & van Walbeek, 2013). In 1993, The Tobacco Products Control Act introduced "health warnings" on cigarette packaging and in advertisements, and the 1999 amendment of this act prohibited the sale of tobacco products to minors (Peer et al., 2009). Despite this, South Africa is the African country with the highest smoking rate (Peer et al., 2009). Talley et al. (2017) confirmed that South Africa has the highest number of cigarette smokers in Africa - 5.5 million, and Groenewald et al. (2007) highlighted that cigarette smoking accounts for a large burden of preventable disease in the country. In 2004 it was found that in South Africa, 20000 (8%) of deaths per year were smoking-related. In 2010 the number had increased to 31800 (10.8%) (Talley et al., 2017).

Winkler et al. (2015) aimed to forecast "lung cancer mortality" in South Africa in 2025. They analyzed data from the 2003 Demographic Health Survey where gender and population group were considered. Winkler et al. (2015) estimated that a marginal increase in "yearly lung cancer deaths" will be observed among the male population, and a substantial increase among the female population. In terms of race, "male mortality" is forecasted to be highest among Asians (including Indians) and lowest among Black people. Among females, mortality rates are expected to be lowest for Asians and highest for the Coloured and White population. Winkler et al. (2015) explained that in order to assign adequate resources to health care initiatives,

forecasting expected patterns of lung cancer mortality and investigating current prevalence distribution is important.

Talley et al. (2017) warned that the declines in smoking rates among South African adolescents have stalled. Peer et al. (2009) found that in South Africa between 1998 and 2003 the young adult (15-24) smoking rate remained largely unchanged and pointed to the importance of intensifying intervention. In 2007, Panday et al. (2007) estimated that 37.6% of South African youths had experimented with smoking in their lifetime and Ayo-Yusuf et al. (2013) found that 1 in 10 young adults progressed from experimental smokers to regular smokers. Nasheeta et al. (2013) cautioned that high smoking rates among adolescents in the country are indicative of a lack of awareness of the dangers of smoking.

Reddy et al. (2007) compared prevalence rates of substance use among high school students in the USA and South Africa. The authors explained that in South Africa, economic development and increased freedom of choice since the apartheid regime, has increased disposable income. Subsequently, an increase in substance use, such as cigarette smoking, has been documented. The authors' expounded that a comparison between developed USA and developing South Africa was appropriate because in both societies, the Black populations were oppressed and disadvantaged, and this has left a legacy of lingering health inequalities. The authors' found that in both South Africa and the USA, the female gender was a "protective" factor against tobacco consumption. "Black race" was also associated with lower rates of cigarette smoking, which Reddy et al. (2007) hypothesized may have been due to unequal rights and opportunities. To conclude, Ellis et al. (2008) explained that it is important to target young adults in cessation efforts, because they function as 'role models' and indirectly influence adolescents smoking behavior.

This study focuses on inhaled tobacco which accounts for approximately 85% of "all tobacco produced worldwide" and has a greater incidence of disease compared to other products. In the NIDS questionnaire, 'smoking' and 'regular smoking' are not defined, henceforth it is open to the respondents interpretation (Vellios & van Walbeek, 2016).

1.2 Theoretical Framework

This study will be set in the context of the World Health Organization (WHO) Commission on Social Determinants of Health (CSDH) framework. Evidence suggests that socio-economic determinants inform the health outcomes of a population. The general theory relating to health outcomes, points to gender, race, income, education and the like, as possible determinants of health status. Cigarette smoking, according to this theory, is an intermediary determinant that falls under behaviours and biological factors. This study will investigate how the intermediary determinant is affected by structural determinants of socioeconomic position. Broadly, social determinants of health comprise of social and economic circumstances that affect the health of communities as a whole, as well as individuals. Smoking behaviour, according to this theory, is associated with sex, age and an individual's social environment (for example income), all of which contribute to a person's health status. The ultimate aim of the theory is to rectify health inequalities via shaping policy.

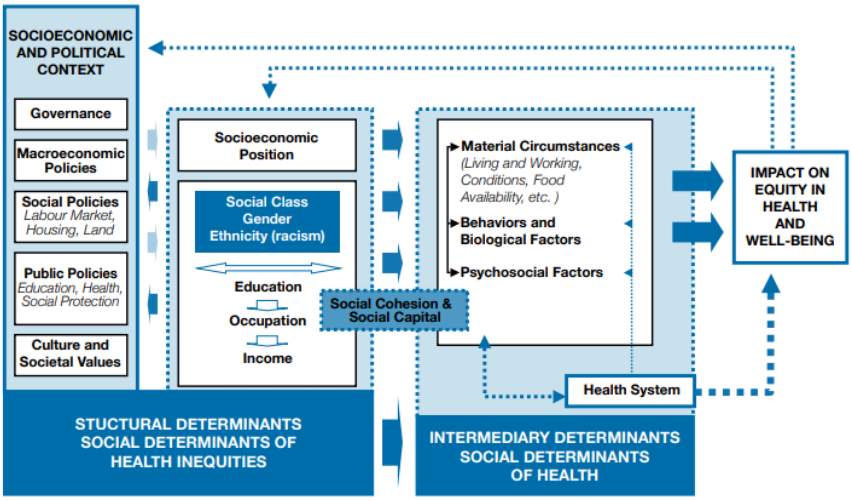


Figure 1.1 WHO/CSDH Framework Diagram

((Include research problem and main research question??))

1.3 Aims and Objectives of the Study

The aim of this study is to investigate factors associated with regular cigarette smoking among young adults in South Africa.
The specific objectives of this study are to:

1. Describe cigarette smoking behaviour among young adults.
2. Investigate the association between demographic factors (race, gender, place of residence) and regular cigarette smoking.
3. Investigate the association between socioeconomic factors (education, occupation, household wealth) and regular cigarette smoking.

Questions:

Objective 1:
What proportion of young adults have ever smoked?
What proportion of young adults have ever smoked regularly?
At what age did those who smoke regularly begin smoking regularly?
What is the average number of cigarettes smoked daily among young adults who have ever smoked regularly?

Objective 2:
Are males more likely than females to smoke regularly?
Is there a difference between race groups in regular cigarette smoking?
Are urban youth more likely to regularly smoke than rural youth?

Objective 3:
Are youth with a lower level of education more likely to regularly smoke?
Is there a difference between occupational groups (school-going scholar, post-school scholar, unemployed, employed) in regular cigarette smoking?
Are youth from low income households more likely to smoke?

1.4 Structure of the Dissertation

This dissertation is separated into five (5) chapters. Chapter one (1) offers background information on cigarette smoking, more specifically, it highlights the importance of a focus on young adults and emphasizes that smoking is a life-threatening, widespread problem that needs to be further researched. In addition it addresses the objectives, research questions and theoretical framework of the study. Chapter two (2) presents a review of literature relevant to the undertaking of the research. Chapter three (3) concentrates on the research methodology, the data set used, a description of the variables and the analysis techniques employed. The limitations of the study are included. Chapter four (4) provides a discussion of the research findings. Chapter five (5) concludes by providing a summary of the research, the limitations and possible future recommendations.

Chapter Two

Literature Review

2.1 Introduction

Ling and Glantz (2002) espoused that tobacco prevention strategies aimed at young adults are limited, as they noted that "during the critical years of young adulthood, public health efforts dwindle at the same time that tobacco industry efforts intensify" (Ling & Glantz, 2002, p. 913). In agreeance, Hammond (2005) explained that "the public health community" in contrast to the attentive tobacco industry, has opted to ignore recent research and has neglected to intervene in young adult smoking, as they are mostly absent from tobacco control strategy across the world.

Hammond's (2005) findings highlighted that young adulthood is a period in which smoking behaviour typically becomes established as a long term addiction. Levin et al. (2014) also

reiterated this notion, and concluded that smoking during adolescents can have a negative impact on the brain, affecting concentration and memory. Other "immediate health consequences" include increased phlegm production, poor fitness levels and shortness of breath (Lutfiyya et al., 2008). It is for this reason that this study was designed to contribute to the sparse body of literature pertaining to cigarette smoking during young adulthood.

At a global level, tobacco consumption is undesirably high, indicative of a need for change in intervention strategy. It is essential that young adults are targeted and informed, as research has shown that they are one of the most vulnerable population groups. This chapter will provide an account of some of the demographic factors related to cigarette smoking among young adults, and related psychosocial factors will be touched on. The following chapter will also highlight smoking in South Africa.

2.2 Smoking in South Africa

South Africa (SA) is undergoing an epidemiological transition, where mortality from infectious diseases has decreased and life expectancy increased. SA, therefore, is facing a double burden of infectious as well as chronic diseases (Winkler et al., 2015). Vellios and van Walbeek (2013), contemporary researchers in the South African field, investigated the "determinants of smoking initiation in South Africa." They examined household as well as individual variables, and considered determinants such as gender, age, geographic location, population group, literacy, alcohol consumption, parent's smoking behaviour and tobacco control legislation. Vellios and van Walbeek (2013) used NIDS wave 1 data (collected in 2008) to investigate the "variables that influence the decision to start smoking."

They found, like Stein et al. (2008) and Winkler et al. (2015) that out of all of the population groups in South Africa the Coloured population was most likely to initiate smoking, and Black females least likely to start using cigarettes. The authors' also found that in the event of a cigarette price change, males were more responsive than females. It was concluded that females and males were more likely to start smoking if their parents smoked, and that individuals who drank "one or more times a week" increased their risk of smoking onset. Vellios and van Walbeek's (2013) study is of value because it was one of the first to consider smoking onset in a middle-income country. This consideration is important, as cigarette use is swiftly moving from

the developed arena to the developing one, heralding a new age of non-communicable diseases. Other general conclusions made included that males typically started smoking at a higher rate than females; those living in urban areas (especially White and Black females) were more likely to smoke, and literacy decreased the likelihood of smoking among both males and females.

Sitas et al., (2013) cautioned that smoking among young Black South Africans is growing rapidly and in concurrence with this notion, Peer et al. (2009) found that subgroups in South Africa with increasing smoking rates included young adults, rural dwellers, women, the poor and less- educated, as well as Black people. Peer et al. (2009) highlighted the importance of grappling with the issues associated with tobacco use among subgroups. They called for the growth of youth-oriented, culturally sensitive and gender-specific prevention and cessation strategies (Peer et al., 2009).

An article by McIntyre and Taylor, although it was written in 1989, provides insight into the notion that although the tobacco industry generates economy-boosting revenue in South Africa, the health care costs and productivity loss far outweigh the economic benefit (McIntyre & Taylor, 1989). In summation, cigarette consumption in South Africa is undesirably high (particularly among young adults) as well as costly, and further research into the mechanisms that underpin it is necessary in order to curb preventable morbidity and mortality.

2.3 Demographic Determinants of Smoking

2.3.1 Age as a Factor Associated with Cigarette Smoking

Terry-McElrath & O'Mally (2015) concurred that across cultures world-wide, smoking initiation typically occurs during young adulthood, and rarely extends past this period. Xue et al. (2007) found in their study, that most adult smokers (approximately 80%) initiated smoking prior to the age of 18 years. Neff et al. (2015), in support of this notion, found that youths in the USA, on average, experimented with smoking at age 15, and by age 18 progressed to daily smokers. Hammond's (2005) predominant argument, contrary to Xue et al. (2007) and Neff et al. (2015), was that "smoking behaviour" is not fixed by the age of 18, but rather develops after that, with Ling and Glantz (2002) also espousing this notion.

Hammond (2005) pointed to the importance of intervention among young adults, and not solely school-going adolescents. His claims were supported by recent survey data from the USA, where one fifth of cigarette smokers started smoking after turning 18. Hammond does not refute the notion that adolescents smoke, however, espoused that regular smoking patterns are typically formed after age 18. Green et al. (2007) also found that in the USA, in their study conducted among university and non-university-educated young adults, regular smoking typically develops between the ages of 20 and 21. In concurrence with Hammond (2005), Ling and Glantz (2002) and Green at al. (2007),Vellios and van Walbeek's (2013) research showed that smoking uptake typically occurs in the "late teenage years" and early twenties.

Sreeramareddy and Pradhan (2015) examined the "prevalence and social determinants of smoking in 15 countries from North Africa, Central and Western Asia, Latin America and the Caribbean" by conducting a secondary data analysis. They found that smoking prevalence increased with age in most countries. Fihlo et al. (2012) established that in the USA there was a "positive association" between the consumption of tobacco and age – as age increased, so did tobacco consumption.

2.3.2 Population Group as a Factor Associated with Cigarette Smoking

According to Kulak et al. (2016), in terms of race and smoking prevalence in America, during the 1970s and 1980s, African Americans had a higher smoking prevalence than their White counterparts. This may have been the case because Black people in America were marginalized and Dutra et al. (2014) found that racial discrimination and being an experimental or current smoker are significantly and positively associated. By the early 1990s, however, a convergence in smoking prevalence among the two population groups was documented. In 2013, White prevalence estimates were "statistically similar" to those of the Black population (Dutra et al., 2014).

Lawrence et al.'s (2014) aim was to determine which "ethnicity" in the United States smoked more in both their teenage years and adult years, as well as to assess the impact of socioeconomic status on smoking. Data from a longitudinal study was analyzed and it was found, in agreeance with Kulak et al. (2016), that Whites smoked much more than African Americans during their teenage years, however, in adulthood both population groups smoked almost the

same amount. The authors' conclusion was that ethnic smoking patterns are independent of SES. Lawrence et al. (2014) therefore asserted the importance of research into the distal determinants of smoking and emphasized the role of long-term disadvantage.

Lariscy et al. (2013) found that in the USA 39% of White, 27% of Hispanics, and 26% of Black young adults were current smokers. Such statistics support Kulak et al. (2016) and Lawrence et al.'s (2014) notion that smoking prevalence rates are higher among the White population during young adulthood. Lariscy et al. (2013) touched on the increased lung cancer rates among the Black population, however, did not provide an explanation for this trend, illustrating a need for further research. A potential elucidation for such a trend, according to Robinson et al. (2015), was that lower rates of smoking cessation exist among the Black population in the USA.

In South Africa, due to the Apartheid regime, certain population groups were not afforded equal opportunities. It is, henceforth, important to study smoking in relation to population group in order to fashion culturally sensitive tobacco intervention strategies. Like Vellios and van Walbeek (2013), Brook et al. (2006) considered parental and racial group factors. They also explored cultural influences like Baretto et al. (2012). The overarching conclusion reached by Brook et al. (2006) was that regular as well as experimental smoking is multi-determined. They also shed light on the notion that interventions should consider strategies unique to population groups. Brook et al. (2006) emphasized that it is important for prevention and treatment programmes to be "multifaceted," and highlighted that linguistic and cultural relevance is vital.

With regard to population group in South Africa, the Asian and Coloured populations had the "highest smoking prevalence" (38.4%), and among Black females, the "lowest total prevalence" was documented (12%) (Winkler et al., 2015). Sitas et al. (2013) confirmed that population groups in SA are at different stages of the tobacco epidemic, and like Winkler et al. (2015), found that the Coloured population had the highest smoking rate in SA, the White population the second highest and the Black population the lowest.

It was found in 2003 in South Africa that Black adolescents' smoking rates (15.7%) were consistently lower than White adolescents (21.7%), as well as Coloured adolescents (38.7%) (Panday et al., 2007). Gilreath et al.'s (2012) later study conducted at a school in Cape Town, South Africa, also found that Black South Africans, when compared to their White and Coloured

counterparts, were significantly less likely to smoke. This, the authors highlighted, may be due to cultural norms. They too found that the Coloured population within the school smoked the most. The authors hypothesized that this is due to greater exposure to White culture. It was established in 2003 that Black South African women had the lowest smoking rates of 10%. Peer et al. (2009) concluded that this was due to social disapproval and gender norms, however, cautioned that these constraints are weakening.

Stein et al. (2008) conducted a "control study" in Johannesburg, in which lifestyle and demographic data was collected from 1690 Black hospital patients suffering from cardiovascular disease or cancer. The study was the first of its kind, and aimed to help pioneer an understanding of tobacco use among the South African Black population. The authors' explained that historically, Black South Africans have had a substantially lower smoking prevalence than their White counterparts due to cultural beliefs. Smoking prevalence among Black South Africans is, however, increasing with the growth of the Black middle class, and over time an increase in Black patients diagnosed with smoking-related illness is predicted. The aim of the authors' analysis was to investigate the burden of disease from Black South African smokers, and it was found that the burden is noteworthy and increasing.

2.3.3 Gender as a Factor Associated with Cigarette Smoking

Giovino et al. (2012) found that, globally, men were more likely to smoke with 48.6 % of men, and 11.3 % of women smoking cigarettes. Similarly, but based on older data, among the 'young adult population' of the world, it was estimated in 2004 that about 18% of males smoked, and 8% of females smoked (Sitas et al., 2004).These findings provide evidence in favour of the notion that in most societies it is significantly more acceptable for men to smoke than for women to smoke. It also highlighted the need to target men when tailor-making intervention strategies. Although males have traditionally higher smoking rates, Williams et al. (2008) cautioned that across the globe, the number of female smokers is predicted to increase rapidly. This can be attributed to intensified efforts by the tobacco industry to recruit new smokers in order to maintain profits. Amos et al. (2012) highlighted that tobacco control policy and research is "gender blind," whereas tobacco companies are using gender-specific strategies to target males and females individually. In addition, McClure et al. (2013) found that females have poorer cessation rates. A study conducted in New York City by Ellis et al. (2008), opposed this finding,

as they found that cessation efforts reduced smoking rates among women, but not among men whose cessation rates stagnated. The authors emphasized the importance of studying subgroups' responses to intervention programmes in order to improve their efficiency.

Higgins et al. (2015) conducted a systematic literature review in order to determine prevalence rates of tobacco and nicotine product use in the USA. Their main finding, in accordance with a large body of literature, was that smoking prevalence among men is typically higher than among women, across all products. The purpose of Higgins' et al. (2015) review was to investigate the gender differences in cigarette smoking prevalence, as well as to examine how gender overlaps with other variables such as education, age, race and socioeconomic status. Due to the abundance of data, the review focused largely on adults in the USA, although findings pertaining to youths were included. The authors found that male smoking rates exceeded those of females starting from middle school and intensify with age.

Hosseinpoor et al. (2011) used pooled data collected from 21 low-income countries and 27 middle-income countries in the World Health Survey to identify socioeconomic and demographic determinants of current smoking. A uniform measurement system for smoking was used in the cross-national investigation to add to the limited knowledge on smoking in the regions. Hosseinpoor et al. (2011) noted that although it has been widely observed that men generally smoke more than women (in prevalence and overall consumption), in some countries such as Norway, Denmark and Brazil, women smoke as much as men. Another potential reason female smoking levels have increased provided by Hosseinpoor et al. (2011), was that smoking signifies modernity, economic freedom and independence. This notion was the impression the tobacco industry worked to create, beginning as early as the 1920s.

Aslam et al. (2014) conducted a secondary analysis of the Global Youth Tobacco Survey in order to determine the factors associated with cigarette smoking among Pakistani school children, as well as to provide a prevalence estimate. The authors found that children most at risk of cigarette smoking experimentation and initiation were female. According to Aslam et al. (2014) tobacco marketing has begun to target girls and women in Pakistan where a societal "evolution" is occurring. A factor that limited the generalizability of the study was that only school-going children were included in the survey. The authors hypothesized that non-school-going children have different determinants of smoking that are influenced by socioeconomic standing.

Barbeau et al. (2004) investigated tobacco industry documents to uncover their target markets in the USA. They, like Williams et al., 2008, exposed that socially disadvantaged young adult women are aggressively targeted by the tobacco industry, which is causing the "gender gap" to narrow further. Fihlo et al. (2012) highlighted that between male and female adolescents in Brazil, males had a higher prevalence of substance use. The authors noted, however, that tobacco use among female adolescents was increasing rapidly.

Although it was found by Sreeramareddy et al. (2014) that men typically smoked more than women in sub-Saharan Africa, in certain countries female smoking rates were particularly high – namely Burundi, Namibia, Sierra Leone and South Africa. In South Africa, smoking prevalence among women is higher than the average in middle-income regions (Sitas et al., 2004) and in 2015, it was estimated that prevalence rates for current smoking were 27.7% for men and 8.4% for women. Historically, Black women have had the lowest smoking rates, with smoking rates estimated to be between 7 to 12% (Williams et al., 2008). Williams et al. (2008) espoused that this can be explained by cultural taboos surrounding cigarette use as it was found that women perceived it to be shameful, manly and disrespectful. Nasheeta et al. (2013) warned, however, that cultural and social constraints that previously dissuaded Black females from smoking, are weakening, particularly in urban areas.

Syamlal et al. (2014, p.2) highlighted that compared to men, women are more likely to suffer 'adverse health outcomes.' He found that women who smoke have a 25% greater risk of developing coronary heart disease and have a higher incidence of lung cancer compared to men who smoke. Another concern, according to Barbeau et al. (2004) is that cigarette smoking impacts female reproductive health. According to Williams et al. (2008), research suggests that smoking among women is rapidly becoming socially acceptable, particularly among the young adult population. In summation, intervention strategies that consider gender are important, and although smoking rates are higher among men, the literature has shown that women are an "at risk" subpopulation.

2.3.4 Geographic Location as a Factor Associated with Cigarette Smoking

According to Levin et al. (2014), investigating geographic inequalities in a county are important in order to gain a better understanding of subgroups that are at risk. The authors warned that

although smoking prevalence is thought to be decreasing among certain population groups, the opposite trend can be viewed among other groups. Levin et al. (2014) highlighted the importance of acknowledging health inequalities, particularly when considering overall population improvement. The authors conducted a study in Scotland, which aimed to uncover the urban/rural smoking prevalence among adolescents. They found that in Scotland, females living in rural areas were more likely to smoke than males, and overall it was found that urban youth smoked more due to greater access to cigarettes.

Levin et al. (2014) also provided international examples of urban/rural smoking prevalence among young adults. In Iceland and New Zealand, a study found no relationship between geographic location and smoking rates. In China, Germany and Greece, it was found that urban adolescents had higher smoking rates than their rural counterparts. Interestingly, in Argentina, Korea and Taiwan, smoking prevalence was highest among rural youths. The authors espoused that differences in smoking prevalence by geographic location may have to do with the "indicators of rurality" used. They further elaborated that highly urbanized Taiwan rurality differs from rurality in Peru, where population density per square kilometer is significantly lower. Socioeconomic and cultural differences among countries might also explain the inconclusive evidence found across the globe (Levin et al., 2014).

Hosseinpoor et al. (2011) uncovered that in middle-income regions those residing in urban areas were more likely to smoke, whereas in low-income regions, this effect was not as defined. This may be because urban areas in low-income countries are less developed (Hosseinpoor et al., 2011). A potential critique of Hosseinpoor et al.'s (2011) study is that daily and non-daily smokers were grouped together as current smokers, despite a large body of literature that has confirmed sociodemographic traits between the two groups are distinct. Sreeramareddy et al. (2014), in concurrence with Hosseinpoor et al. (2011), found that in sub-Saharan African countries rural dwellers smoked more.

Lutfiyya et al. (2008) compared urban/rural smoking rates in the USA and found, contrary to previous smaller studies, that rural youths smoked more. The authors' hypothesized that because rural youths are not exposed to protective anti-smoking messages, they are less aware of the dangers of smoking than their urban counterparts. The authors explained that in rural tobacco-growing areas, accessibility to cigarettes is greater and smoking more socially acceptable. The

authors concluded that increased anti-tobacco 'actions' in rural settings in the US are vital in order to curb both adolescent and adult smoking rates.

Wlodarczyk et al. (2013) also espoused that urban/rural smoking patterns differ across the globe. In Germany it was found that urban residents smoked more than their rural counterparts, however, in Canada those residing in rural areas had higher smoking rates due to "fewer restrictions concerning smoking" (Wlodarczyk et al., 2013, p.589). Wlodarczyk et al. (2013) set out to investigate and compare smoking prevalence in rural and urban Poland. They found that among adults, urban dwellers smoked more, however, a trend reversal was noted among young adults where rural dwelling youths smoked more. Tiwari et al (2015) compared urban/rural smoking prevalence among women living in Central India. They found that rural-dwelling women smoked more (24%) than their urban-dwelling counterparts (12%). The authors hypothesized that urban women were better educated on the harmful effects of tobacco, and therefore smoked less.

Williams et al. (2008) examined the impact of 'urbanicity' on the smoking behaviour of Black women in Cape Town, South Africa. They espoused that the process of development and urban growth has been found to herald chronic illness, and Williams et al. (2008) established that it plays an important role in elevating smoking rates among Black women in South Africa. The authors explained that this is due to a variety of reasons. Firstly, exposure to tobacco advertisement increases dramatically, and secondly, urban/rural transition can be stressful, prompting cigarette use. Thirdly, cultural taboos weaken since 'urbanicity' is associated with westernization. Williams et al. (2008) warned that there is potential for a smoking epidemic to occur among Black women. The authors concluded by imploring policy makers to tailor creative anti-smoking messages that target urbanized young Black women.

Mashita et al. (2011) conducted research to assess smoking prevalence among a sample of rural-dwelling South African children. They found that rural male children were more likely to smoke than female children, as they typically spend more time outside the home where they are engaged in cattle rearing and animal husbandry, and where exposure to cigarette smoking is greater. Female children, on the other hand, spend more time within the household, helping with cooking and cleaning and are taught that it is unacceptable and taboo for women to smoke cigarettes. Nasheeta et al. (2013) found that in SA, urban youths smoked more than rural youths. The

authors expressed concern that young females residing in urban regions were experiencing increased smoking uptake. Although smoking in rural SA remains relatively low, it has been identified by the tobacco industry as a lucrative market, and efforts to recruit rural South African smokers are predicted to intensify (Ayo-Yusuf et al., 2013).

In 1989, little was known about the determinants and prevalence of smoking in South Africa's Black 'townships.' Strebel et al. (1989) noted this 'gap' in the literature and made a valuable contribution to the field at the time. The authors' interest was urbanization and how it elevates smoking rates, particularly among Black men. Other determinants investigated included targeted advertisement, and social acceptance. Their overarching aim was to implement "appropriate interventions." An outdated but interesting finding was that "men who had spent 6 or more years in the city were more likely to be smokers compared to those with 5 or less years urban experience."

Strebel et al. (1989) explained that in developing countries tobacco consumption is rising, particularly in the urban setting. Strebel et al. also found that among higher primary school children in the "Black township population of Cape Town," smoking prevalence grew with peer pressure, age and poor health knowledge. The authors' findings suggested that "increased earning power" and urbanization elevates smoking rates. Although the study is outdated, the main sentiment remains valid – intervention programme success depends on an in-depth understanding of the determinants of smoking.

2.4 Socioeconomic Determinants of Smoking

2.4.1 Household Income as a Factor Associated with Cigarette Smoking

Hosseinpoor et al. (2012) used data from the World Health Survey to assess socioeconomic inequalities in current smoking in 48 low- and middle-income countries. The study confirmed that those most burdened by tobacco-related disability and premature death are the poor. Hosseinpoor et al. (2012, p. 5) stated that, "the association between smoking and poverty is apparent at all levels." According to the authors, consumption, prevalence and initiation are higher among the poor, and cessation rates are lower. They also highlighted that among low socioeconomic groups, a large portion of household income is spent on cigarettes which diverts funds away from education and health care. Hosseinpoor et al. (2011) reported that in China,

poor households spend over 10% of their household income on cigarettes. Sreeramareddy et al. (2014) also found that in sub-Saharan Africa poor men and women were more likely to smoke than their rich counterparts. The authors hypothesized that this may be due to the perception that smoking has an appetite suppressant effect.

Mistry et al. (2011) examined the relationship between income and adolescent experimental and established smoking. They found that adolescents from lower income groups were more likely to smoke. The authors hypothesized that this may be due to increased "predatory marketing" by tobacco companies in poorer areas and less "preventative initiatives." Another contributing factor according to Mistry et al. (2011), is that adolescents belonging to lower income groups suffer psychosocial stress and use cigarettes as an unhealthy coping strategy. Poonawalla et al. (2014) also found a significant association between household income and adolescent smoking, as it was documented that adolescents from lower income households were more likely to engage in tobacco use.

"The remarkable decline in cigarette smoking over the past 40 years has been more marked in higher- than in lower- income persons, creating a sizeable income-based disparity" (Franks et al., 2007, p. 1873). Franks et al. (2007) investigated the role of excise taxes on tobacco in "income-based" disparities. Less recent studies suggested that lower income households were more sensitive to cigarette price increases. Implicit in this notion is that in response to excise increases, those from lower income groups stop smoking at a greater rate than their higher income counterparts. Franks et al (2007), however, found that increasing excise tax does not promote smoking cessation among the poor, nor does it reduce "income-based" disparities. The authors warned that "the smoking participation gap may even be widening" (Franks et al., 2007, p. 1876). The authors, therefore, refuted the notion that increasing excise tax positively contributes to cessation among the disadvantaged, and highlighted that this strategy further burdens poorer households. The authors recommended a focus on education to reduce smoking disparities.

Yun at al. (2015, p.1) explained that household income "is associated with usable material and financial resources," and a lack of such resources effects 'health behaviours.' The authors found that in Korea, household income had a strong independent effect on smoking in both men and women. Their results indicated that lower household income groups had a higher risk of smoking

uptake than higher household income groups. Their results were consistent in both urban and rural areas. A proposed explanation for this finding was that those from lower household income groups may adopt smoking as a coping mechanism, and may be uneducated as to the harmful effects of smoking.

2.4.2 Employment as a Factor Associated with Cigarette Smoking

Employment as a factor associated with cigarette smoking is important to consider, as "the workplace offers a potentially effective venue for tobacco prevention programmes" (McCurdy et al., 2003, p.643). Targeting occupational groups with high smoking rates may assist in the overall health of a population. McCurdy (2003) and his colleagues uncovered that across Europe, as well as the USA, smoking prevalence was highest among men who worked on mines, in construction, and with metal. For women, occupational groups with the highest prevalence of smoking were cleaners and hairdressers. McCurdy et al. (2003, p. 645) stated that "employment is a strong correlate of smoking." They further explained that after adjusting demographic factors (such as sex, age, and education), employment associations persisted. They concluded with the notion that knowledge of employment status is necessary when developing cessation programmes.

Syamlal et al. (2015) found that in the USA, 19% of working adults smoked cigarettes. It was documented that those in the education services smoked the least, and workers in legal, real estate and construction occupations smoked the most. Overall declines in smoking prevalence were viewed among White collar-workers, however, among blue-collar workers increases were documented. In agreeance with McCurdy et al. (2003), Syamlal et al. (2015) implored policy makers to direct their attention to the workplace, where cessation messages can easily be disseminated.

2.4.3 Education as a Factor Associated with Cigarette Smoking

According to Zhu et al. (2010, p.1), "education is one of the strongest predictors of smoking behaviour." Hosseinpoor et al. (2011) found that among individuals residing in middle- and low-income countries, education has a protective effect for both men and women. The authors explained that those individuals with no education were approximately 3 times more likely to smoke. The authors concluded, after controlling for socioeconomic factors and age, that

education was a key determinant of smoking, regardless of the region. In support of this notion, Sreeramareddy et al. (2014) found that less educated sub-Saharan men and women were more likely to smoke than their educated counterparts. The authors suggested that this may be because less educated people typically lack knowledge about the harmful effects of tobacco use.

Kendel et al. (2011) sought to investigate the reversal in cigarette smoking prevalence among White and Black people in the USA. To further elaborate, it has been well-documented that smoking rates are highest among White adolescents, however, a 'crossover' in cigarette smoking prevalence occurs at some point in adulthood, where Black smoking rates surpass that of their White counterparts. This phenomenon was termed "The Age Crossover Hypothesis," by Geronimus et al. in 1993. Kendel (2011) and his colleagues found that numerous factors accounted for the reversal in smoking rates, however, educational attainment was deemed the most prominent explanation for the crossover. The authors explained that educational attainment serves as a protective factor against smoking, as it enhances social advantages and economic prospects. Kendel et al's. (2011) final sentiment was that education "needs to be a major focus of prevention and intervention."

Solberg et al. (2007) emphasized the importance of combatting the rising prevalence of smoking among young adults using education. They found that young adults with high school level education were less likely to start smoking and were more likely to quit smoking. Green et al. (2007) espoused that tobacco cessation efforts have typically focused on university-going young adults. The authors henceforth examined the smoking behaviour of non-university-educated young adults which comprise of a large section of the young adult population in the USA. Green et al. (2007) found that non-university-educated young adults smoked twice as much as their university-educated counterparts, and were more likely to initiate smoking. The authors' uncovered that a university education (socioeconomic determinants aside) was a pertinent predictor of smoking behaviour, and advised that cessation programmes focus on young adults who do not attend university.

Dube et al. (2010) predicted that education level may play a role in how effectively anti-tobacco messages are received – those with higher levels of education may better understand that cigarette smoking is a health hazard. They also warned that although cigarette smoking among young adults in the USA has declined over the years, declines are currently slowing. Solberg et

al. (2007) also found that in the USA, young adults with high school level education were less likely to start smoking because they were better equipped to understand anti-tobacco messages.

Lenk et al. (2014) undertook a study with the objective to "examine cigarette smoking among young adults based on education status" (Lenk et al. 2014, p. 303). The authors were interested in college students in the USA, and found that postsecondary education acted as a "protective factor" against cigarette smoking. They also found, like Solberg et al. (2007) that young adults who did not attend college or university were more likely to smoke. Their final sentiment was that more tobacco control policies need to be implemented outside of universities.

2.5 Psychosocial Determinants of Smoking

Fihlo et al. (2012) conducted a systematic literature review in order to deduce the "prevalence of alcohol and tobacco use among Brazilian adolescents." They espoused that research into substance use among adolescents is of value, as it can be indicative of a population's health status. According to the authors, this may be the case because "habits" formed during adolescence are continued into adulthood. The authors main objective was to identify "high-risk" subgroups, in order to inform policy adequately.

Alongside age and gender, risk factors that were addressed in the literature reviewed were environmental factors (they included substance use by friends and family, religiosity and conditions in the work place). Fihlo et al. (2012) found that non-religious adolescents smoked and drank more than their religious counterparts. Another finding was was that adolescents that were exposed to substance use by family and friends were more likely to use substances themselves. Lastly, psychosocial factors (such as negative feelings and parental/child conflict) were found to increase the likelihood of tobacco and alcohol use among adolescents. Fihlo et al. (2012) highlighted that it is important to lessen a young adult's exposure to various risk factors in order to reduce substance use and abuse.

According to Brook et al. (2006), research investigating cigarette smoking among young adults in South Africa has focused largely on prevalence. Their study aimed to inform anti-tobacco prevention strategies, as well as fill a 'literature gap,' as scant research in South Africa has focused on the mechanisms underlying cigarette smoking among young adults. The authors provided an in-depth examination of the "personal, interpersonal, and cultural predictors of

stages of cigarette smoking among adolescents in Johannesburg." The study's focus was urban Black, White, Coloured and Indian youth.

The stages of cigarette smoking (the dependent variable) included the progression from "non-smoking, to experimental smoking, to regular smoking." To the authors' knowledge, their study was the first in South Africa to deal with external and internal influences. Lantz (2003) investigated the rise at the time in young adult smoking in the USA. Lantz et al. also studied smoking in relation to the use of other substances, and compared 'college and non-college' young adults. He found that young adults who attended church less frequently, who had depressive symptoms, believed their peers approved of cigarette smoking, and believed experimenting with smoking was safe, were more likely to experiment with cigarettes and become smokers. Lantz et al. (2003) also noted that young adults wanting to lose weight were more likely to start smoking, as well as those who believed that smoking alleviates social anxiety and stress. Lantz also acknowledged the impact of tobacco marketing strategies, for example night club and bar promotions, on young adult smoking.

Harakeh and Vollebergh (2012) examined the impact of peer groups on young adult smoking. They introduced their research with the following statement, "peer influence is considered one of the most important and consistent predictors determining smoking by young people" (Harakeh and Vollebergh, 2012, p. 656). They concluded that a young adult is significantly more likely to smoke if members of their peer group smoke. Like Harakeh and Vollebergh (2012)), Hu et al. (2013) espoused that peer influence is a predominant predictor of cigarette smoking.

2.6 Conclusion

Lawrence et al. (2014) opened their paper with the following valuable statement, "early onset of smoking leads to stronger addiction, inhibits later cessation, and implies the need for policies to focus on anti-smoking interventions early in life. Ellis et al. (2008) also deemed cessation among young adults vital, as their research showed that early cessation substantially reduced the risk of premature death. It has been well-established that decreasing smoking in young adulthood is beneficial for the individual as well as the overall population. The following statements support this notion - "The expenses regarding health care caused by cigarette users are approximately 30% higher than those incurred by non-smokers" (Wlodarczyk et al., 2013, p. 589), and "half of

all life-time smokers, most of whom reside in low- and middle- income countries, will die prematurely due to smoking, losing 20 to 25 years of their life expectancy" (Ayo-Yusuf et al., 2013, p. 2428).

Higgins et al. (2015) noted that although cigarette smoking prevalence has decreased substantially since the 1964 Surgeon General's Report, this decrease has been viewed among certain subpopulations. White affluent males are an example of a subpopulation in which a decrease in cigarette smoking has been noted, among young adults and females smoking rates are declining at a slower pace. The authors noted that this "unevenness" warrants closer inspection of subpopulations.

Hosseinpoor et al. (2011) highlighted that in low- and middle- income countries tobacco companies are "aggressively" targeting women and young adults, and because of this global tobacco consumption is predicted to increase and reach epidemic proportions. "Tobacco has been identified as the single biggest cause of inequality in morbidity."(Palipudi et al., 2012, p.1) Palipudi et al. (2012) highlighted that there is significant disparity in mortality and morbidity between poor and wealthy people. They elaborated that certain economic and social determinants place certain vulnerable groups at a disadvantage, and according to Hosseinpoor et al. (2011) health inequalities in smoking are a social injustice.

Chapter Three

Methodology

3.1 Introduction

The primary objective of the study is to investigate the factors associated with cigarette smoking among young adults (16-25 years old) in South Africa. In the following chapter, the methodology employed for the study, is described. The chapter begins with a description of the location of the study, South Africa, and the subsequent section provides a background on the primary source of data, the National Income Dynamic Study (NIDS) wave 1 and 3. The latter section highlights the variables related to cigarette smoking, and a discussion of the methods used to analyze the data follows. The ethical considerations as well as a brief summary of the study conclude the chapter.

3.2 Location of the Study

The data used in this study was collected from the Republic of South Africa, a country previously governed by a political system called Apartheid. Under this regime people, of colour were discriminated against and oppressed by the White minority. In 1994, after years of conflict and turmoil, the first democratic election was held in South Africa, changing the course of the country's history (Dutra et al., 2014). South Africa lies between latitudes 22 degrees and 35 degrees south, and longitudes 16 degrees and 33 degrees east. The land area is approximately 1.22 million square kilometres and the neighbouring countries include Namibia, Botswana, Zimbabwe, Mozambique, Lesotho and Swaziland. South Africa is divided into 9 provinces – the Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Limpopo, Mpumalanga, Northern Cape, North West and the Western Cape. According to the most recent national census, conducted in 2011, South Africa's population was estimated to be 51.77 million. The 5 commonly used racial categories in SA include Black, White, Coloured, Indian/Asian and other (Dutra et al., 2014).

3.3 Source of the Data

The first national panel study in South Africa was initiated by the South African Labour and Development Research Unit (SALDRU) in 2006. Entitled the National Income Dynamic Study (NIDS), the objective was to uncover the trajectory of development of South Africa as well as the country's residents over time. The data collected by the inaugural panel study pertained to indicators of health, education, the well-being of individual household members, overall household composition and structure, household income and expenditure, labour market participation and economic activity.

One of the downfalls of other household surveys is that they fail to engage with all household members. Typically, the head of the household and one other member is engaged in an interview or encouraged to complete a questionnaire. A disadvantage of this method is that an accurate representation of the household may not be achieved. In contrast, the NIDS researchers on average interviewed approximately four individuals of the household. In comparison to household data, NIDS provides a more representative view of the country as a whole, and simultaneously offers greater insight into variables at an individual level.

3.4 Sample Design

The NIDS survey is an ongoing or longitudinal investigation, which is conducted every two years, in order to 'track' the changes in households and their members. The first wave of the NIDS panel study, conducted in 2008, comprised of 31 170 individuals from 7 305 households. The sample was drawn from 400 primary sampling units (PSUs) across all 9 provinces. 300 fieldworkers undertook to collect the data, and the design of the NIDS study was multi-staged and clustered. Wave 3 of the NIDS survey took place in 2012, where 8 040 households and 32 633 household residents were successfully interviewed.

3.5 Non-Response

When considering how representative the NIDS data is, interviewee non-response and refusal rates warrant attention. The accuracy of estimates of indicators meant to be representative of the South African population may, be biased by a high non-response rate. Individuals or households that have no data typically refused to answer the questionnaire, and 1 246 adults selected to

participate in the NIDS study refused to answer the questionnaire during the first wave and 221 adults refused to answer in wave 3. This was for various reasons, including that they were too busy, unavailable or at work. Non-response can occur at three levels. Firstly, the household as a whole may not have been interviewed, which occurs when the fieldwork team cannot contact the selected household, or when the household refuses to participate. Secondly, an individual belonging to a household may refuse to participate (this may be related to employment time constraints). Lastly, the third level of non-response involves individuals refusing to divulge certain information (which may be considered private or sensitive, such as income). Non-response by participants can bias results, limit statistical power, as well as alter how representative the data is, which can lead to the underestimation of certain phenomenon, such as employment.

Refusal rates for the current research were examined using the variables *w1_a_refexpl* and *w3_a_refexpl*. These variables reported reasons for refusal to participate in the survey and were converted into dummy variables (refused to answer: Yes or No), for which associations against demographic variables: gender, age and population group were run (for ages 16-25 years old).

Total response rates for the subset (16-25 years) in wave 1 were 92.53% and in wave 3 were 98.86%

Results are shown in the table below:

Table 3.1: Refusal Rates* (Age 16-25)	**P value**		**P value**
	WAVE 1	**WAVE 3**	
Gender	0.000		0.835
Male	9.4%	1.0%	
Female	5.7%	1.0%	
Age	0.000		0.452
15-19	5.5%	0.9%	
20-24	8.9%	1.2%	
25	10.1%	0.9%	
Population Group	0.000		0.000
African	6.1%	0.8%	
Coloured	13.0%	1.8%	
Asian/Indian	18.2%	5.9%	
White	13.8%	1.8%	

*Non-response rates unweighted. P values from chi-square test

Differences in refusal rates in wave 1 were found in all the demographic variables. In wave 1 being a male was associated with higher refusal rates. Older participants were more likely to refuse to respond and the Asian/Indian population groups were also more likely to refuse to respond. In wave 3 the only significant association with refusal was across race, with Asian/Indians being less likely to respond similar to the wave 1 result. Post-stratification weights were used in an effort to minimize the effect of this non-response bias.

3.6 Weighting Measures

Weighting involves giving certain responses more weight. This may be necessary, if for example, a population comprises of 50% males and 50% females, but the sample comprises of 70% males and 30% females. In such an instance, female responses would be weighted more in order to reduce the oversampled male population. In the current research, post-stratification weights were used in the bivariate and logistic regression analyses to reduce the non-response bias.

The NIDS derived weights in two stages. "In the first, the design weights were calculated using the inverse of the inclusion probability. In the second, the weights were calibrated to the 2008 midyear estimates" (Wittenberg, 2009, p. 27). The authors, however, highlighted that because complications arose in practice, more than two sets of weights were calculated. In order to reduce the effect of households with very high weights, the weights were trimmed to the 95^{th} percentile of the weights. With regard to calibration, post-stratification was used to adjust the weights, which enables the sample to mirror the population to a certain degree (in terms of demographic characteristics and provincial distribution, for example). Often samples are uneven, and down-weighting over-representative variables, or weighting up under-representative variables may provide a more accurate measure of the variable (Wittenberg, 2009).

In the NIDS, missing responses or non-responses are indicated in the data with negative numbers. When data for a specific variable was not collected, the missing value is generally coded -3 (with the exception of the date variable). All analyses for the current study were done including missing data, and all figures and statistics reported are with missing data included.

3.7 Variable Description and Measurement

Outcome or dependent variables

This research seeks to examine smoking behaviours in adolescents and young adults. Variables in the NIDS (wave 1 and 3) dataset pertaining to smoking behaviour were used to profile the average smoker's smoking behaviour.

Variables used in the main analysis:

The outcome variable used in the main analysis was generated by combining two smoking variables from the NIDS data.

J22: Do you smoke cigarettes? No = 0, Yes = 1 "Smokes cigarettes currently"

J23: Did you ever smoke cigarettes regularly No = 0, Yes = 1 "Used to smoke regularly"

These variables "Smokes cigarettes currently" and "Used to smoke regularly" were combined to form the dummy "Ever Smoked" variable for both waves 1 and 3. If participants answered yes to either J22 or J23, they received the value 1 for "Ever Smoked" dummy variable. This was the variable used in the main analysis on smoking behaviour.

Ever smoked: No = 0, Yes = 1

This meant the outcome variable was a measure of ever having smoked and/or currently smoking.

Variables used to explore smoking behaviour:

J25: How old were you when you first smoked cigarettes regularly?

J24: How old were you when you last smoked cigarettes regularly?

J26: On average, how many cigarettes per day did you/do you smoke?

Independent or explanatory variables

The independent variables were broken down into three categories: Demographic variables, education variables and economic variables:

Independent variable coding (wave 1 and 3)

Demographic Variables	
Gender	Male = 1, Female = 2
Age Categories	15-19 = 1, 20-24 = 1, 25 = 3
Population Group	African = 1, Coloured = 2, Asian/Indian = 3, White = 4
Urban/Rural	Urban = 0, Rural = 1
Education variables	
Currently Enrolled in School	No = 0, Yes = 1,
Matric	No = 0, Yes = 1
Tertiary Education	
Economic Variables	
Currently Employed	No = 0, Yes = 1
Household Income	<R3000=1, R3000-R8500=2, >R8500=3

The NIDS "best" variables were used for the demographic variables of Gender, Age and Population group. The urban/rural variable was generated by taking the derived variables (w1_hhgeo2011 and w3_hhgeo2011) and making a dummy variable which separated the categories into Urban and Rural. The "currently enrolled in school" variable came from the variable (ed12cur), "Are you currently enrolled in any school or classes or correspondence courses of any kind?" The Matric and tertiary education variables were generated from the (best_edu) variable. Two dummy variables were generated, one for responses consistent with having obtained a Matric and one for having obtained a tertiary degree. The variable currently employed was taken from the (em1) variable, "Are you currently being paid a wage or salary to work on a regular basis for an employer (that is not yourself) whether full time or part time?" and

the household income came from the derived variable (hhincome) which was then categorized in "less than R3000", "between R3000 and R8500", and "over R8500".

3.8 Data Analysis

This study was a secondary data analysis of the NIDS waves 1 and 3 datasets to measure the degree to which certain factors are associated with smoking among young adults in South Africa and how they have changed over time. The quantitative software, Stata version 12.1 (Special Edition) was used for data analysis. Firstly, descriptive statistics for smoking were reported for waves 1 and 3, these included the percentage of people currently smoking and who used to smoke, and the combined variable 'ever smoked regularly.' It also looked at age first smoked, age last smoked and average number of cigarettes smoked per day.

Next, a bivariate analysis was conducted, using the combined, "Ever smoked" variable. This analysis employed the use of crosstabs to establish the association between the dependent variables and the independent variables in both wave 1 and 3. Chi-Squared tests were included to test for significant associations. Variables that were found to be significant in the bivariate analysis were then added to a multivariable logistic regression model for both waves with the "Ever smoked" variable being used as the dependent variable. The variables "Matric" and "Tertiary Education" were also added, although not significant in the bivariate analysis because previous literature has indicated education has an effect on smoking behaviour (Gilman, 2008). Results are presented as odds ratios. Comparisons between waves were not done.

The equation for the logistic regression is given below:

$$Ln(P_i/1 - P_I) = \propto + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_k X_{Ki}$$

P_i – The chance of participants reporting that they have ever smoked independent variable (odds ratio)

β_k – Dependent variables regression coefficients (gender, age, education, economic etc.)

3.9 Ethical Considerations

The Commerce Faculty Ethics committee granted ethical approval for the NIDS questionnaire and study protocols. The committee agreed that the participants had been appropriately "addressed" and informed. Ethical approval for the secondary analysis of this data for the purposes of this study was obtained from the Humanities and Social Sciences Committee (UKZN).

3.10 Validity, Reliability and Rigour

In terms of the NIDS, it has proven to be a reputable and dependable study by many academics. The expansive NIDS sample size, as well as the consistent strategies employed to obtain information, increases the reliability of the data. The reliability of a study can also be affected by the elapsing of time – in the current analysis, similar results have been noted between the NIDS wave 1 and 3, and this suggests the result is reliable at present. The NIDS is a longitudinal study, conducted every two years, making it more current and reliable. The NIDS data was collected systematically and in a consistent manner, improving the rigour of the data.

In terms of the validity of the secondary study, the research questions are strongly related to the variables that will be investigated (commonly referred to as 'face validity') and a wide range of measures will be used to compute the current studies results, increasing validity. In conclusion, the NIDS can be considered reliable and valid because of the high response rates and representative sample.

3.11 Conclusion

The chapter has outlined the methodology that was used for this secondary study. The primary source of the data, the NIDS, was discussed at length, and the methods of analysis were explained. The variables, the reliability and validity as well as some ethical considerations were provided.

Chapter Four

Results

4.1 Introduction

The results of the secondary data analysis are presented below. Firstly, the demographics of the sample are provided, followed by a report of the descriptive statistics of smoking behaviour. The results from the bivariate analysis are then given and lastly the multiple logistic regression results are presented.

4.2 Demographics

The data for the analysis was drawn from the NIDS wave 1 and wave 3 datasets and focused specifically on young adults (16-25 years old). The sample size for wave 1 was (n = 5528) and for wave 3 (n = 6155). All those who met the age criteria were included in the analysis. Females comprised of approximately 51.0% to 53.0% of the sample in both waves 1 and 3. According to population group in wave 1, 82.0% were African, 13.5% Coloured, 1.4% Asian/Indian, 3.1% White and, 47.3% resided in urban areas. The majority (85.8%) of the sample was unemployed in wave 1. In wave 3, of those sampled, 82.8% were African, 12.9% Coloured, 1.5% Asian/Indian, and 2.8% White. 48.4% resided in urban areas and 84.1% were unemployed. Of those sampled 44.0% to 45.0% were currently enrolled in an education facility in both waves 1 and 2. This included both high school and tertiary education facilities.

Table 4.1: Demographics of sample(Age 16-25 years)*		
	WAVE 1 (n=5528)	**WAVE 3(n=6155)**
Gender		
Male	47.3%	49.0%
Female	52.7%	51.1%
Population group		
African	82.0%	82.8%
Coloured	13.5%	12.9%
Asian/Indian	1.4%	1.5%
White	3.1%	2.8%
Urban/Rural		
Urban	47.3%	48.4%
Rural	52.7%	51.6%
Currently Enrolled		
No	55.6%	55.9%
Yes	44.4%	44.1%
Employment Status		
Employed	14.2%	15.9%
Unemployed	85.8%	84.1%

*unweighted percentages

4.3 Smoking Behaviour

Table 4.2 reports the descriptive statistics for smoking. In wave 1, 11.0% CI [9.9-12.2] of young adults reported that they were current smokers compared to wave 3 with 10.4% CI [9.2-11.8] showing no significant difference. This suggests smoking levels among young adults have remained largely the same over the two waves. A similar pattern was found for the variable "used to smoke regularly" and the combined "ever smoked regularly" variable that showed no significant differences between wave 1 and wave 3.

Table 4.2: Smoking descriptive statistics*		
	WAVE 1	**WAVE 3**
Smokes cigarettes currently	11.0(9.9-12.2)	10.4(9.2-11.8)
Used to smoke regularly	2.2(1.7-2.9)	1.5 (1.1-2.2)
Ever smoked regularly	13.2(12.0-14.5)	12.0(10.7-13.4)
Age first smoked	16.3(16-16.6)	16.3(15.9-16.7)
a. Age last smoked	19.4(10-28.8)	18.5(17.5-19.5)
Ave number cigarettes/day	6.8(6.1-7.4)	7.1(6.3-7.9)

Weighted using design weights
a. **Subset:** those who used to smoke

The average age at which participants first smoked remained similar at around 16 years old in both wave 1 and wave 3. Figure 4.1 shows the distribution of ages first smoked, and in waves 1 and 3 it largely centred around 16 years to late teens.

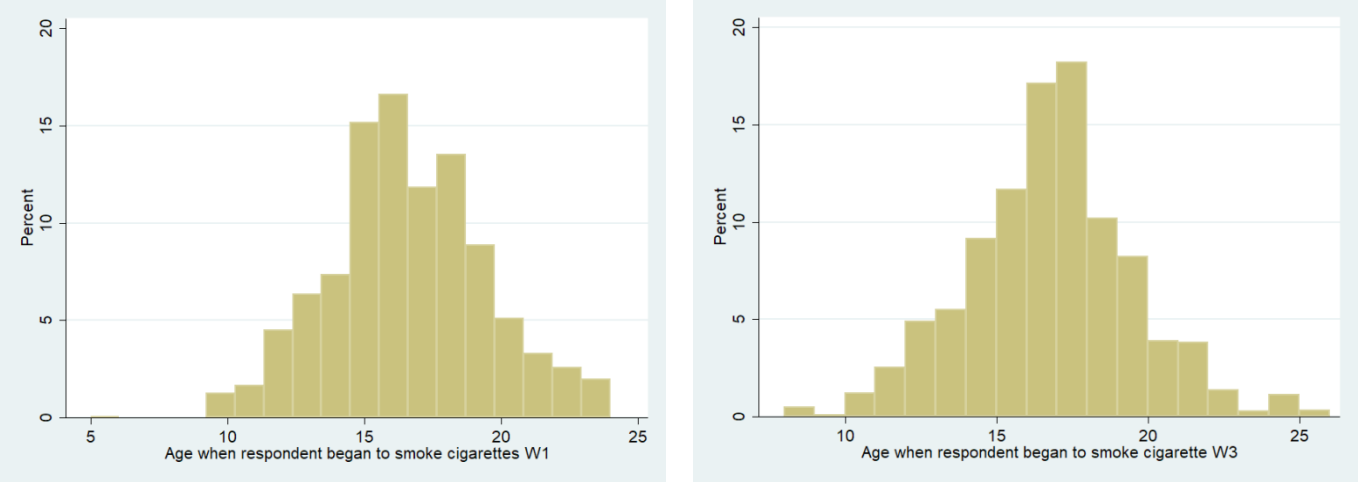


Figure 4.1: Distribution of age first smoked in young adults for NIDS wave 1 and 3

The average age at which participants, who had given up smoking, last smoked in wave 1 was 19.4 and 18.5 years in wave 3 as shown by figure 4.2.

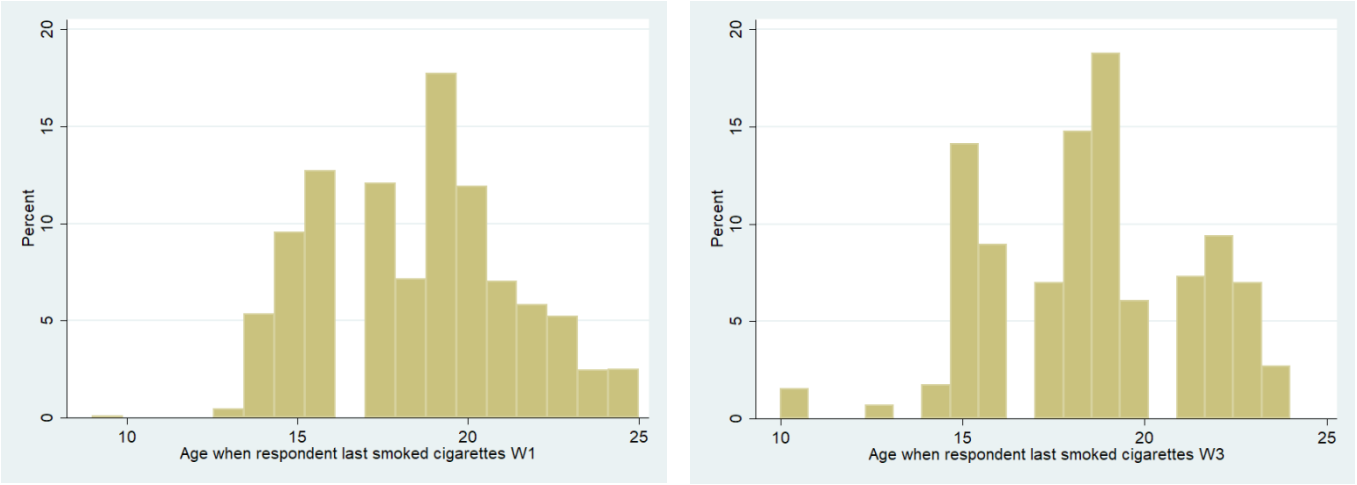


Figure 4.2: Distribution of age last smoked in young adults from NIDS wave 1 and wave 3

The average number of cigarettes smoked per day was similar in wave 1 and 3. With respondents reporting that they smoked 6.8 cigarettes in wave 1 and 7.1 cigarettes per day in wave 3, with both waves having a similar distribution as shown in Figure 4.3.

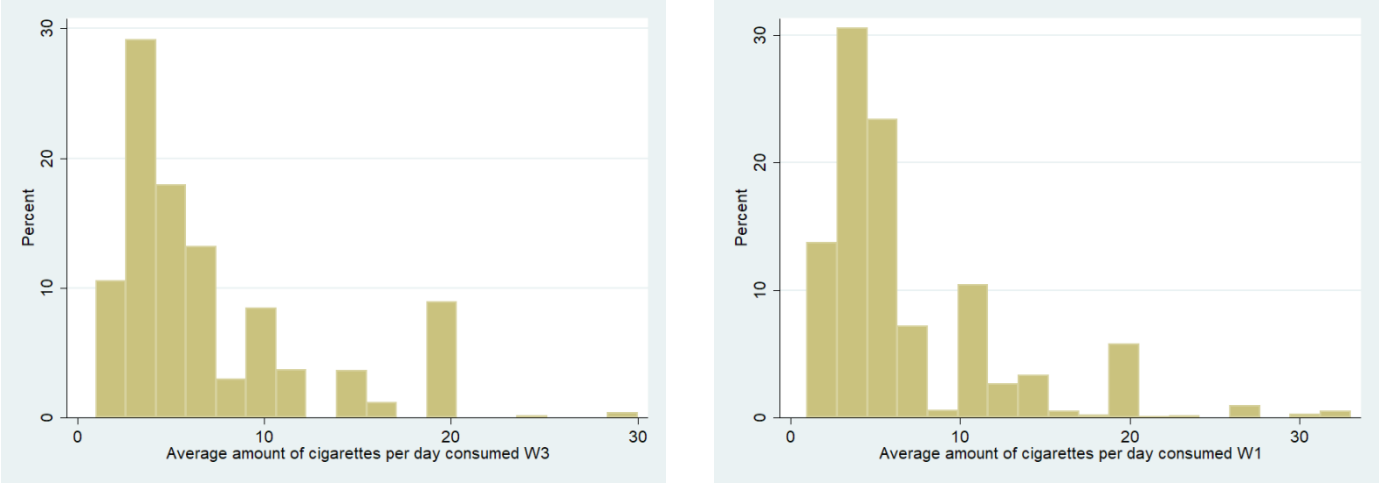


Figure 4.3: Distribution of the number of cigarettes smoked in wave 1 and 3

4.4 Bivariate Analysis

Table 4.3 shows the results of the bivariate analysis of the "ever smoked" variable. Smoking among young adult males was found to have increased from wave 1, with 16.78% of males reporting that they smoked, to wave 3 with 19.8%, although this increase was not statistically significant. Among the young adult female respondents, a non-significant decrease was noted between wave 1 at 5.2% and wave 3 at 4.0%. Significant differences between male and female respondents across both waves 1 and 3 were found.

Table 4.3: Bivariate Analysis: Have you ever smoked regularly?* (%)

	WAVE1(95% CI)	P value	WAVE 3 (95% CI)	P value
Demographic variables				
Gender		0.000		0.000
Male	16.8(14.4-19.4)		19.8(17.6-22.2)	
Female	5.2(3.9-6.8)		4.0(2.9-5.4)	
Age		0.000		0.000
15-19	9.6(8.1-11.4)		7.2(5.7-9)	
20-24	15.5(13.7-17.6)		14.4(12.5-16.6)	
25	18.3(13.8-23.9)		19.4(14.1-26.3)	
Race		0.000		0.000
African	11.0(9.8-12.3)		10.0(8.8-11.4)	
Coloured	28.0(22.7-34.1)		29.6(23.5-36.5)	
Asian/Indian	12.8(6.3-24.2)		22.0(8.8-45.3)	
White	22.9(15.8-31.4)		11.7(5.5-23.2)	
Urban/Rural		0.000		0.000
Urban	15.9(14.0-17.9)		14.9(12.9-17.2)	
Rural	9.25(8.0-10.6)		8.2(6.9-9.8)	
Education variables				
Currently Enrolled		0.000		0.000
No	22.6(20.3-25.0)		21.4(19.0-24.0)	
Yes	9.1(7.5-10.9)		6.3(4.7-8.3)	
Matric		0.093		0.375
No	14.2(12.7-15.8)		12.0(10.6-13.7)	
Yes	11.1(9.1-13.5)		11.8(9.3-14.9)	
Tertiary Degree		0.574		0.368
No	16.2(14.7-17.8)		14.1(12.6-15.9)	
Yes	14.4(9.4-21.5)		17.0(11.4-24.8)	
Economic variables				
Currently Employed		0.000		0.000
No	13.9(12.4-15.5)		12.1(10.6-13.8)	
Yes	33.5(28.1-39.4)		27.4(22.2-33.4)	
Household income		0.000		0.000

<R3000	12.1(10.7-13.7)	9.0(7.5-10.9)
R3001-R8500	13.9(11.5-16.7)	13.9(11.7-16.5)
>R8500	15.9(12.5-19.9)	16.8(15.3-18.5)

Percent reporting currently smoking or previously had smoked regularly weighted by design weights
P-values reported are from Chi-square test

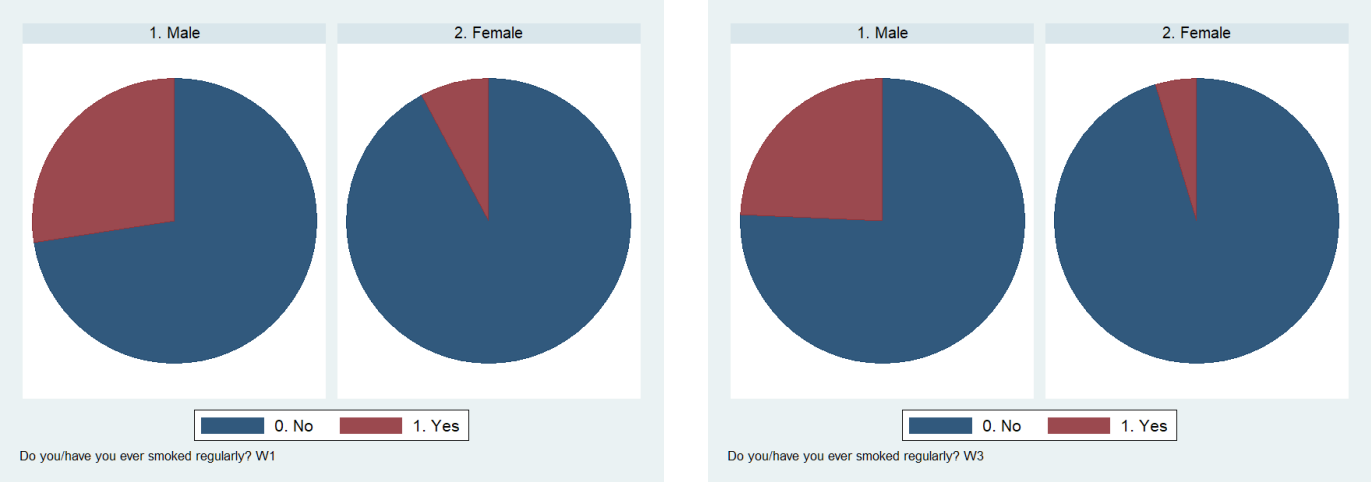


Figure 4.4: Smoking by gender in waves 1 and 3

Among the participants aged 15 to 19, a decrease in smoking between waves was documented as 9.6% smoked in wave 1 and 7.2% smoked in wave 3. The participants between the ages of 20 and 24 reported smoking at 15.5% in wave 1 and 14.4% in wave 3. Participants aged 25 reported a non-significant increase between waves 1 and 3, where 18.3% smoked in wave 1 and 19.4% in wave 3. In both waves 1 and 3, age was seen to be significantly associated with ever having smoked. In both waves 1 and 3 the participants aged 25 smoked the most, followed by those between the ages 20 and 24. The young adult participants that smoked the least were between the ages of 15 and 19.

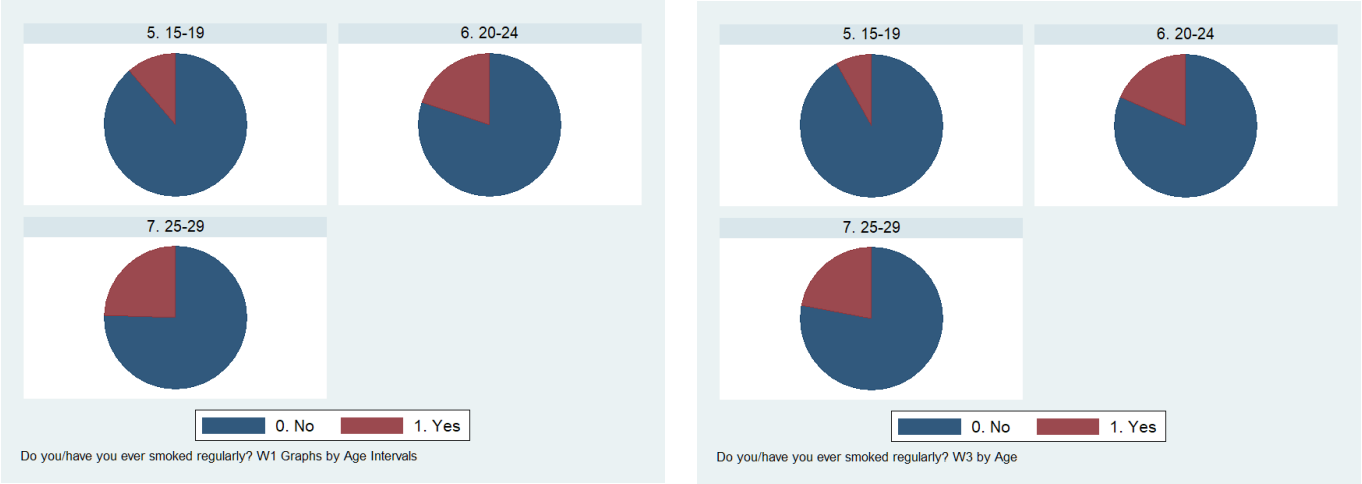


Figure 4.5: Smoking by age group in wave 1 and 3

In terms of population group, within wave 1, the Coloured population group had the highest rates of smoking with 28.0% reporting ever having smoked, second were the White participants with 22.9%, followed by the Asian/Indian participants at 12.8%, and the African participants smoked the least at 11.0%. In wave 3, the Coloured population group again had the most participants that reported that they smoked 29.6%, second was the Asian/Indian population group reporting a rate of 22.0%, followed by the White population group with a reported rate of 11.7%, and lastly the African population group at 10.0%.

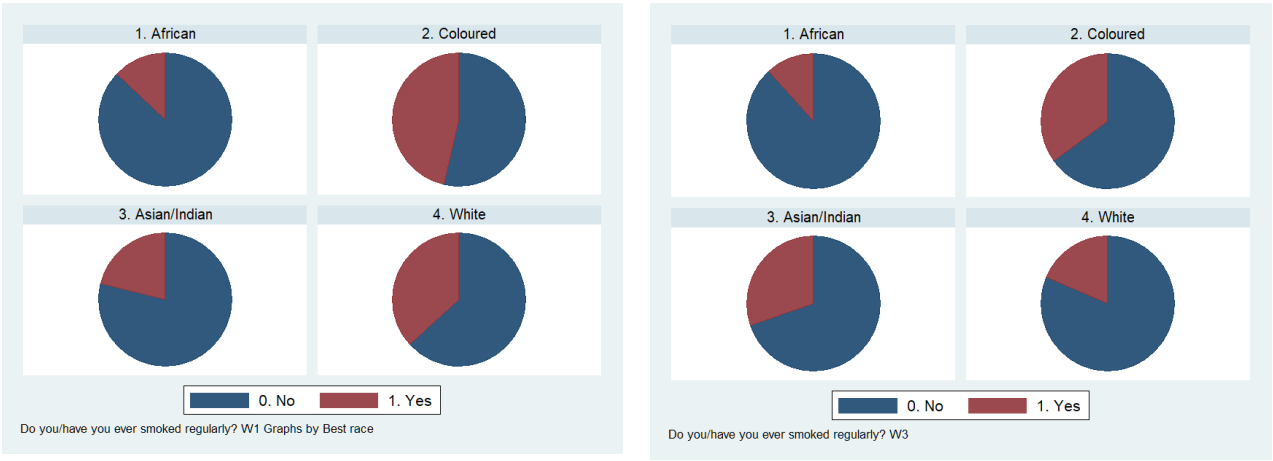


Figure 4.6: Smoking by population group in wave 1 and 3

In terms of geographic location in wave 1, urban-residing young adults smoked more with 15.9% reporting ever having smoked compared to 9.3% of rural dwelling young adults. In wave 3, the pattern remained consistent, as urban-residing young adults smoked more with 14.9% compared to 8.2% in those residing in rural areas. Differences between wave 1 and 3 were not significant.

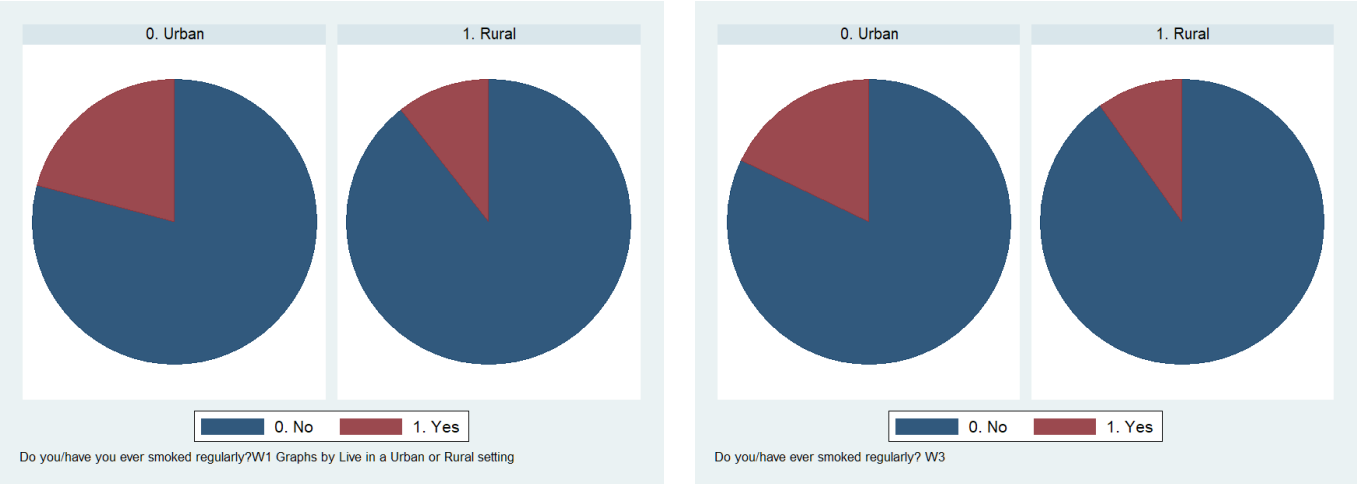


Figure 4.7: smoking by geographic location in wave 1 and 3

With regard to education, young adults who were currently enrolled in school in wave 1 smoked less than those not enrolled in school at a rate of 9.1%, compared to 22.6%. In wave 3, those currently enrolled also smoked less at a rate of 6.3% than those not enrolled, with 21.4% reporting ever having smoked. Across waves 1 and 3 a marginal but not significant decrease was noted among those not enrolled in school.

Completing Matric was not statistically associated with ever having smoked in both waves 1and 3. Later, in the logistic regression output, obtaining a Matric was significantly associated with being less likely to ever smoke. The chi-squared test found no statistically significant association between having a tertiary degree and ever smoking in both waves 1 and wave 3. Differences between waves 1 and 3 were not significant.

In terms of economic variables, the young adults who were unemployed in wave 1 smoked substantially less at 13.9% compared to those who were employed at 33.5%. In wave 3 a similar result was found as those who were unemployed smoked less at 12% than those who were employed at 27.4%. There was no significant difference between waves 1 and 3 in terms of employment.

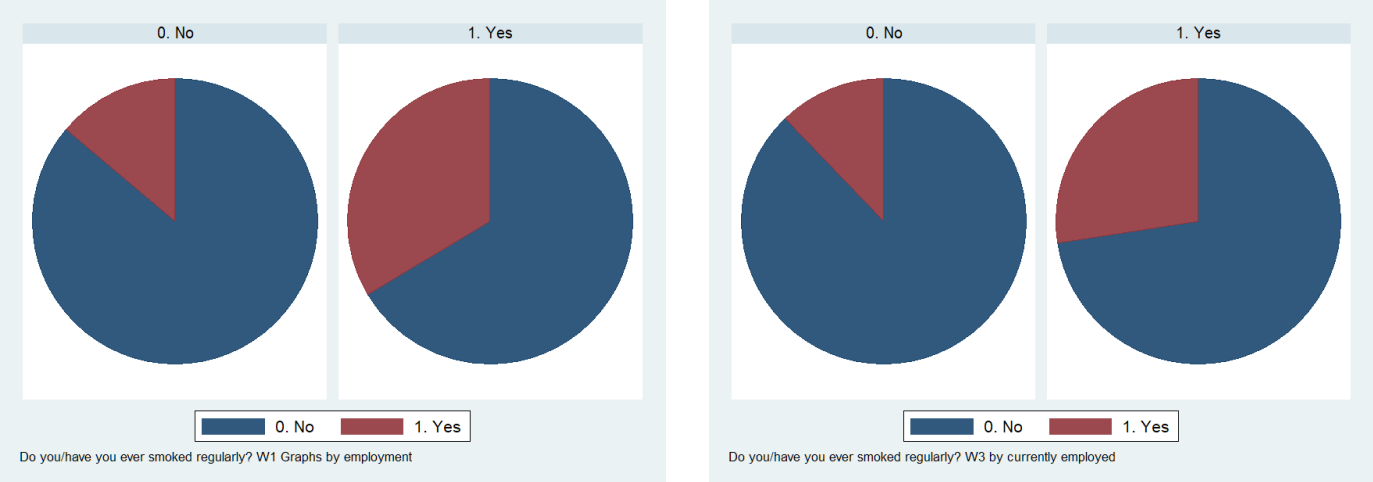
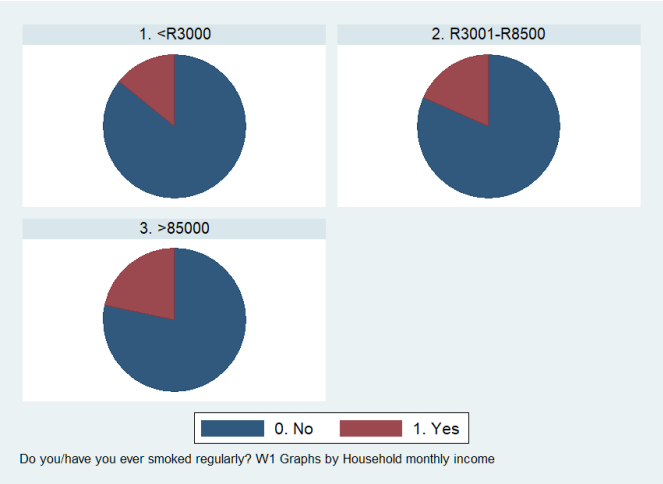


Figure 4.8: Smoking by current employment in wave 1 and 3

With regard to the results on household income, in wave 1 the young adults that belonged to a household that earned less than R3000 a month smoked the least with 12.1% reporting ever smoking, and second were those from a household that earned between R3001 and R8500 with 13.9% reporting ever smoking, and 15.9% of young adults with a household income of more than R8500 smoked. In wave 3, a similar pattern was seen, as the young adults from a household earning less than R3000 a month smoked the least with 9.0% reporting that they had ever smoked, followed by those from a household earning between R3001 – R8500 at 13.9%. The young adults with a household income of more than R8500, smoked the most, with 16.8% reporting that they have ever smoked. There was no significant difference between waves 1 and 3 in terms of household income.



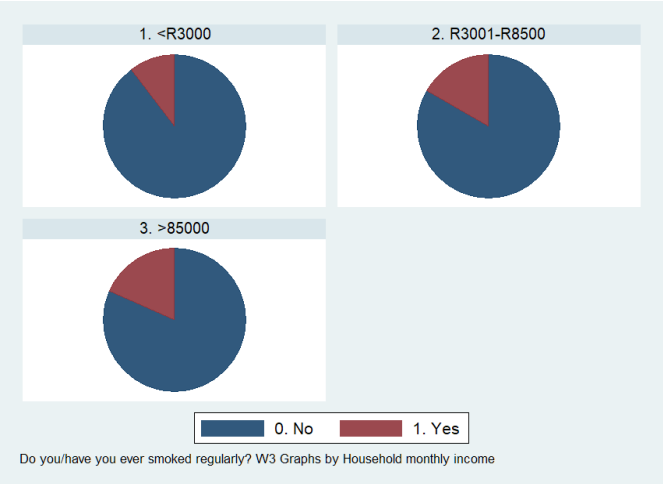


Figure 4.9: Smoking by household income in wave 1 and 3

4.5 Logistic Regression Analysis

Table 4.4 presents the results of the multivariable logistic regression analysis. Variables from the bivariate analysis were added to a logistic regression model.

Gender

In wave 1, females were 85% less likely to smoke than males and this remained the same in wave 3 with females 88% less likely to smoke.

Age

Age is also significantly associated with having ever smoked. In wave 1 people aged 20-24 were 88% more likely to have ever smoked than people aged 15-19. People aged 25 were 102% more likely to have ever smoked than 15-19 year olds. In wave 3 the people aged 20-24 years old were 52% more likely to have smoked than people aged 15-19 years old, and 25 year olds were 127% more likely to have ever smoked than people aged 15-19 years old.

Population Group

The population group was significantly associated with ever having smoked, with the African population group being used as a reference group. The Coloured population group was 620% and 403% more likely to have ever smoked in waves 1 and 3 respectively, when compared to the African population group. The White population group in waves 1 and 3 were 375% and 219% more likely to have ever smoked respectively.

Education Variables

Currently Enrolled in School/Education

Respondents who indicated that they were currently enrolled in an educational facility were less likely to report having ever smoked in both waves. With wave 1 being 64% less likely and wave 3 being 78% less likely.

Matric

Those that had obtained their Matric were associated with being 42% and 53% less likely to smoke than those who had not in wave 1 and 3 respectively.

Tertiary Degree

Having received a tertiary degree was not significantly associated with ever having smoked. Those who had reported that they had obtained a tertiary degree in wave 1 had a 40% less likelihood of ever having smoked, and those in wave 3 who reported having a tertiary degree had an 11% greater likelihood of ever having ever smoked, compared to the reference group.

Economic Variables

Currently Employed

Currently employed young adults were associated with being more likely to smoke in both waves 1 and 3 datasets. Wave 1 is associated with being 30% more likely to have ever smoked and wave 3 being 18% more likely.

Household Income

Household income was not significantly associated with an increased likelihood of ever smoking in both waves 1 and 3.

Table 4.4: Logistic Regression: Have you ever smoked?*				
	WAVE 1 (odds ratios)	**P value**	**WAVE 3 (odds ratio)**	**P value**
Gender				
Male	1.00		1.00	
Female	0.15(0.11-0.20)	0.000	0.12(0.09-0.16)	0.000
Age				
15-19	1.00		1.00	
20-24	1.88(1.32-2.68)	0.000	1.52(1.16-2.01)	0.003
25	2.02(1.17-3.49)	0.012	2.27(1.54-3.34)	0.000
Race				
African	1.00		1.00	
Coloured	7.19(4.45-11.62)	0.000	5.03(3.86-6.55)	0.000
Asian/Indian	2.13(0.87-5.17)	0.097	2.11(0.84-5.31)	0.114
White	4.73(2.33-9.61)	0.000	3.19(1.32-7.70)	0.010
Urban/Rural				
Urban	1.00		1.00	
Rural	0.57(0.44-0.74)	0.000	0.59(0.48-0.73)	0.000
Education variables				
Currently enrolled				
No	1.00		1.00	
Yes	0.36(0.25-0.53)	0.000	0.22(0.16-0.29)	0.000
Matric				
No	1.00		1.00	
Yes	0.58(0.41-0.81)	0.001	0.47(0.36-0.61)	0.000
Tertiary Degree				
No	1.00		1.00	
Yes	0.60(0.31-1.18)	0.138	1.11(0.75-1.64)	0.592
Economic variables				
Currently employed				
No	1.00		1.00	
Yes	1.30(0.90-1.86)	0.161	1.18(0.91-1.52)	0.208
Household Income				
<R3000	1.00		1.00	
R3001-R8500	1.04(0.76-1.42)	0.826	1.18(0.94-1.48)	0.155
>R8500	0.92(0.57-1.47)	0.716	1.22(0.90-1.66)	0.198

Weighted by design weights

4.6 Conclusion

In the above chapter, the descriptive statistics, bivariate analysis and logistic regression results were provided. The demographic, education and economic variables were examined. Of the variables, the demographic and education variables appeared to be more important and this finding was consistent in both waves 1 and 3.

Chapter Five
Discussion

5.1 Introduction

The following chapter comprises of the discussion, recommendation, and limitation section of this study and each variable analyzed will be touched on.

5.2 Discussion

The results of this study show that smoking behaviour among young adults has not significantly decreased between wave 1 and 3 and it can, therefore, be expanded that the level of smoking among young adults remained similar over time. This is concerning, as between NIDS wave 1 (conducted in 2008) and wave 3 (2012), 4 years had elapsed and the percentage of current smokers among the young adult population in South Africa remained constant. This finding highlights the need for better intervention strategies as well as further research on the topic.

Age was a major determining factor in both waves 1 and 3, with older respondents more likely to report that they smoked. This is consistent with young adults starting to smoke later, or with early initiation, and continued smoking into the mid-twenties. The data indicates that the second explanation is more correct, with respondents indicating that the average age they initiated smoking was around 16 years old, and many continued to smoke into their twenties. This is consistent with varying estimates of the age of smoking initiation in the United States by Xue et al. (2007), Neff et al. (2015) and Wilkinson et al. (2007), showing that smoking was initiated prior to the age of 18. Whereas, Hammond (2005), Ling and Glantz (2002), Vellios and van Walbeek (2013), and Freedman et al. (2012) found that initiation occurs during the late teenage years and early twenties. Studies conducted by Fihlo et al. (2012) and Green et al. (2007) also found that the age group most likely to initiate smoking were post school-going young adults. In this study, of those who started and stopped during the ages 16-25, the average age that cessation occurred was around 18-19 years old.

In accordance with the WHO Commission on Social Determinants of Health (CSDH) framework, this study investigated the socioeconomic determinants, such as population group gender, income and education as potential determinants of smoking. The results of this study showed that Coloured youth were the most likely to have ever smoked and the Black youth were the least likely to have smoked in either wave 1 or wave 3. This is in accordance with other evidence from South Africa. Vellios and van Walbeek (2013), Winkler et al. (2015) and Sitas et al. (2013) found that the Coloured population initiated smoking at a greater rate than any other population group, as well as had the highest smoking-attributable mortality rates. Gilreath et al. (2012) and Panday et al. (2007) concurred that among young adults in SA, the Coloured population was most at risk of smoking initiation.

Sitas et al. (2013) and Peer et al. (2009) cautioned that smoking among the Black South African population is increasing, and Stein et al. (2008) elaborated that this may be due to the growth of the Black middle class. Further, Tharp et al. (2012) noted that "individuals of different racial and ethnic backgrounds have been explicitly targeted by the tobacco industry" (Tharp et al., 2012, p. 844). Brook et al. (2006) hypothesized that in SA, "ethnic discrimination" increased the probability of smoking, while other cultural influences, such as "ethnic identification" functioned as protective factors. Among young adults, however, it was found that the percentage of Black smokers remained consistent between the two waves.

Globally, it was documented in 2012 by Giovino et al. (2012) that men smoked at a far greater rate than women. Among the young adult population of the world, Sitas et al. uncovered in 2004 that 18% of males smoked and 8% of females smoked. Williams et al. (2008) cautioned that worldwide, the female smoking rate is rising, and Amos et al. (2012) attributed this to gender-specific marketing strategies employed by the tobacco industry. Interestingly, in Brazil and some Nordic countries females smoke as much as males.

Sreeramareddy et al. (2014) categorized South Africa as a country in which female smoking rates are "particularly high" and Sitas et al. (2004) espoused that female smoking prevalence in SA is higher than the average prevalence in middle-income regions. Sitas et al. (2004) found that in SA in 2004, 27.7% of men smoked and 8.4% of females smoked. Significantly, it was found

by Syamlal et al. (2014) that women are negatively affected by smoking to a greater extent than men. Cigarette smoking impacts women's reproductive functioning as well as the health of their children, and Jha et al. (2013) has shown that smoking cessation among the global female population is poor. Although at a global level male smoking rates are higher than that of the female population, Amos et al. (2012) highlighted that male smoking rates are declining, whereas female rates are still rising.

Vellios and van Walbeek (2013) found that smoking initiation among young adults in SA is much higher among males than females, and the results of this study support this finding, as smoking rates among males were significantly greater than that of the female population. The results showed that being female was significantly associated with being less likely to smoke than males across waves, and that male participants smoked more than their female counterparts. There was no indication of a rise in female smoking among young adults between wave 1 and 3.

The results showed that urban young adults smoked significantly more than their rural counterparts. This is in agreement with the finding made by Vellios and van Walbeek (2013) that urban residing youths in SA have a significantly increased risk of smoking. This may be the case according to Williams et al. (2008), because individuals living in urban areas are exposed to cigarette advertising more than their rural counterparts. It was found by Finch et al. (2010) that in China, the migration from rural to urban areas increased cigarette smoking extensively due to ease of access and stress.

According to Pampel (2006, p. 19) "a well-known" relationship exists between education and cigarette smoking, and there is abundant evidence that suggests those with lower education have a higher risk of smoking. The results of this study, in concurrence with the literature (Vellios and van Walbeek, 2013) highlighted that education may be a protective factor against smoking, as those currently enrolled in school smoked less and those that had obtained a matric were significantly associated with being less likely to smoke.

According to Zhu et al. (2010, p.2) “education is one of the strongest predictors of smoking behaviour,” and those with lower educational achievement were less likely to quit and more likely to start smoking. In France it was also documented by Redonnet et al. (2012) that low educational achievement “predicted” tobacco use. Zhu et al. (2010) cautioned, however, that there are certain complex underlying factors that contribute to smoking prevalence among those less educated, and according to Vellios and van Walbeek, education may prevent initiation of smoking, and delay its onset, however, may not act as a protective factor post-initiation. Lower educational attainment often precipitates lower occupational and financial status. Gilman et al. (2008) henceforth espoused that cigarette smoking may be a coping mechanism among individuals with lower levels of education. Obtaining a tertiary degree was not shown to decrease smoking behaviour. This could be due to young adults starting to smoke before they leave high school, and could perhaps suggest that early educational interventions are better. This could also be explained by a relatively small sample of youth who had completed their degree by the age of 25 years.

The bivariate analysis showed that unemployed young adult participants smoked less than their employed counterparts, but when controlling for other variables in the logistic regression, this effect was reduced to non-significance. It is, however, consistent with Green et al. (2014) and McCurdy et al. (2003), who showed that employment is a strong predictor of smoking, as young adults in the workplace are often times exposed to colleagues that smoke as well as have an income to afford cigarettes. Other literature showed, however, that elsewhere in the world employment was a protective factor (Redonnet, 2012).

With regard to household income a similar pattern was documented across waves with young adults from higher income households more likely to smoke, although this result was not significant in the logistic regression analysis when controlling for other variables. This is in accordance with Vellios and van Walbeek’s (2013) finding that higher-income South African household members initiate smoking at a greater rate than their lower-income counterparts. It was also found by Vellios and van Walbeek (2013) that although those from lower-income households smoke less, their cessation rates are lower. In contrast, in developed countries, Barbeau et al. (2004, p.115) found that “smoking correlated with being from a low income

household" and Green et al. (2014) agreed that disadvantaged young adults in a developed setting are more likely to smoke. "Children who experience socioeconomic disadvantage at any time during childhood were more likely to smoke by age 15 years of age than children who experienced stable adequate income" (Poonawalla et a., 2014, p. 10).

5.3 Recommendations

Cessation techniques that work among adults may not be as effective among youth. Peer et al. (2009) espoused that the tobacco control policies implemented in SA have had minimal impact on young adults and their research demonstrated that among adolescents in South Africa, smoking rates had remained largely unchanged. The authors were divided as to the effectiveness of excise tax increases on smoking cessation. Ayo-Yusuf et al. (2010) and Jha (2012) promoted "aggressive taxation," and argued that the poor are more sensitive to tax increases, and are therefore more likely to practice cessation. Jha (2012, p. 569) stated that "the single most important intervention to raise cessation rates is a large increase in taxes." Vellios and van Walbeek (2013, p. 21), like Jha (2012) stated that, "tobacco taxation in South Africa should remain a major public health instrument to discourage smoking. Further increases in the excise tax on cigarettes are likely to discourage the smoking habit and to delay onset for those who decide to start." Vellios and van Walbeek (2013) recommended that increasing the price of cigarettes would lower initiation among young adults, especially among the male population.

In contrast, van Walbeek's earlier work (2002), described that "because of the fact that the poor spend a greater proportion of their income on cigarettes than the rich, tobacco excises tax comprises a relatively larger proportion of their income" (van Walbeek, 2002, p. 471). van Walbeek explained that when tax places a heavier burden on the poor, it is known as 'regressive tax.' Findings by Franks et al. (2007, p. 7) also suggested that "cigarette excise taxation may have become an ineffectual public health tobacco-control policy" because the smoking population in SA has become "less sensitive" to taxation. Franks et al. (2007) concluded that the income-based disparities in smoking participation is widening, as a greater burden is placed on low-income groups.

Franks et al. found that the average low-income household spent at least 25% of their income on cigarettes – diverting funds from education and health care. Franks et al. (2007), like van Walbeek (2002), firmly asserted that increasing taxes is an ineffective and unfair tobacco-control measure and recommend education and cessation programmes. Franks et al. further elaborated that excise tax may be a more viable strategy in wealthier settings where people are informed, however, in lower-income groups it has been shown to increase disparity. Although van Walbeek (2002) found that young adults were more responsive than adults to increasing cigarette prices, according to Ali (2012, p.648) "relying on taxes alone is not sufficient to reduce smoking among young adults." The authors recommended that increased "social awareness" of the dangers is more likely to be beneficial. van Walbeek (2002) questioned whether the South African government would channel funds into promoting cessation rather than benefitting from excise tax revenue.

Peirce et al. (2005) found that youth oriented anti-tobacco media campaigns had contributed to declines in young adult smoking rates in California and asserted that this may be a potential solution in SA. Jha (2012) also recommended mass counter-advertisement campaigns. Panday et al. (2007) questioned the effectiveness and applicability of intervention programmes aimed solely at White adolescents in SA. Ayo-Yusuf et al. (2010) highlighted that in SA warning labels are printed in English, which, they explained, ignores the linguistic diversity in the country. A possible solution, according to Ayo-Yusuf et al. (2010), is the introduction of "graphic visual warning labels" which communicate the harmful effects of cigarette smoking to the less educated. Villanti et al. (2014) found in the USA that the introduction of graphic health warning labels played a role in preventing smoking initiation and encouraged cessation in young adults. Intervention and prevention strategies in SA will be more beneficial if they are linguistically and culturally appropriate and sensitive.

On-going surveillance of current tobacco control strategies, the incorporation of life-skills programmes in schools that specifically target smoking behaviour, and the provision of "attractive" alternatives to smoking may be potential solutions. SA is a multi-ethnic society and because of this, creative anti-smoking programmes are a necessity in order to combat the potential epidemic. Pharmacological smoking cessation treatments such as nicotine replacement

therapies using Bupropion have proven to be effective and van Walbeek (2002) recommended that the South African government subsidize nicotine replacement therapies, especially among the young and the poor.

5.4 Limitations

One potential limitation of the NIDS study used is that the data may be biased by nonresponse. Some participants may have refused to answer the questions pertaining to cigarette smoking as it is considered a "sensitive" topic, especially because the data used related to young adults. A potential limitation of using secondary data in this study could be that the research question has to be aligned with the data available in order for it to be answered. Since a researcher has not conducted the research personally, this is often a difficult task. According to Vellios and van Walbeek (2013, p.20), "in the NIDS survey, some of the demographic groups, especially Asians, have limited representations in the survey and thus cannot conclude anything about such groups with any degree of certainty."

Another potential limitation is that the study is purely quantitative, which limits a more in-depth exploration of the 'human lived experience,' such as an individual's motivation for smoking and other psychosocial determinants. Other independent variables of interest that were not available because this was a secondary analysis included, parental smoking, substance use (which the literature has shown co- varies with tobacco use), peer influence, religious beliefs, and exposure to advertisement. According to Pampel (2006) the cultural components of cigarette smoking also warrants attention. Lastly, comparing research is made difficult, as dissimilar measures of smoking are used across studies, and since in the NIDS questionnaire, 'regular smoking' was not specifically defined, respondents may have interpreted it differently, leading to some measurement error (Vellios & van Walbeek, 2016).

5.5 Conclusion

In lower-income countries public health is less concerned with cessation programmes because the tobacco industry is economy-boosting (Franks et al., 2002). The literature has shown,

however, that although the tobacco industry is a lucrative market, and has economy advancing potential, the morbidity cost to society far outweighs the economic developments, particularly in the future. In the 1984 US Surgeon General's report, it was implored that a smoke-free society be achieved by the year 2000. In the present (2018), although great strides have been made to remedy the social ailment, the world, particularly the developing third world, is far from achieving smoke-free status.

Reducing disparity in health behaviour on a population level is a difficult task – one which requires an in-depth understanding of the multiple mechanisms underlying the health behaviour (Zhu et al., 2010). The relative stability of smoking rates among young South Africans over time infers that the negative health behaviour is still prevalent in the society and further research on the topic, particularly among young adults, is necessary. Further research on the mechanisms underpinning the phenomenon is vital and the development of cessation programmes that are youth-oriented, gender specific and culturally and linguistically relevant are an urgent necessity as early cessation is vastly beneficial (Peer et al., 2009).

"If young adults turn away from smoking, the industry will decline, just as a population which does not give birth will eventually decline" (Hammond, 2005, p. 185).

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